# FOOD ENGINEERING

September 1953

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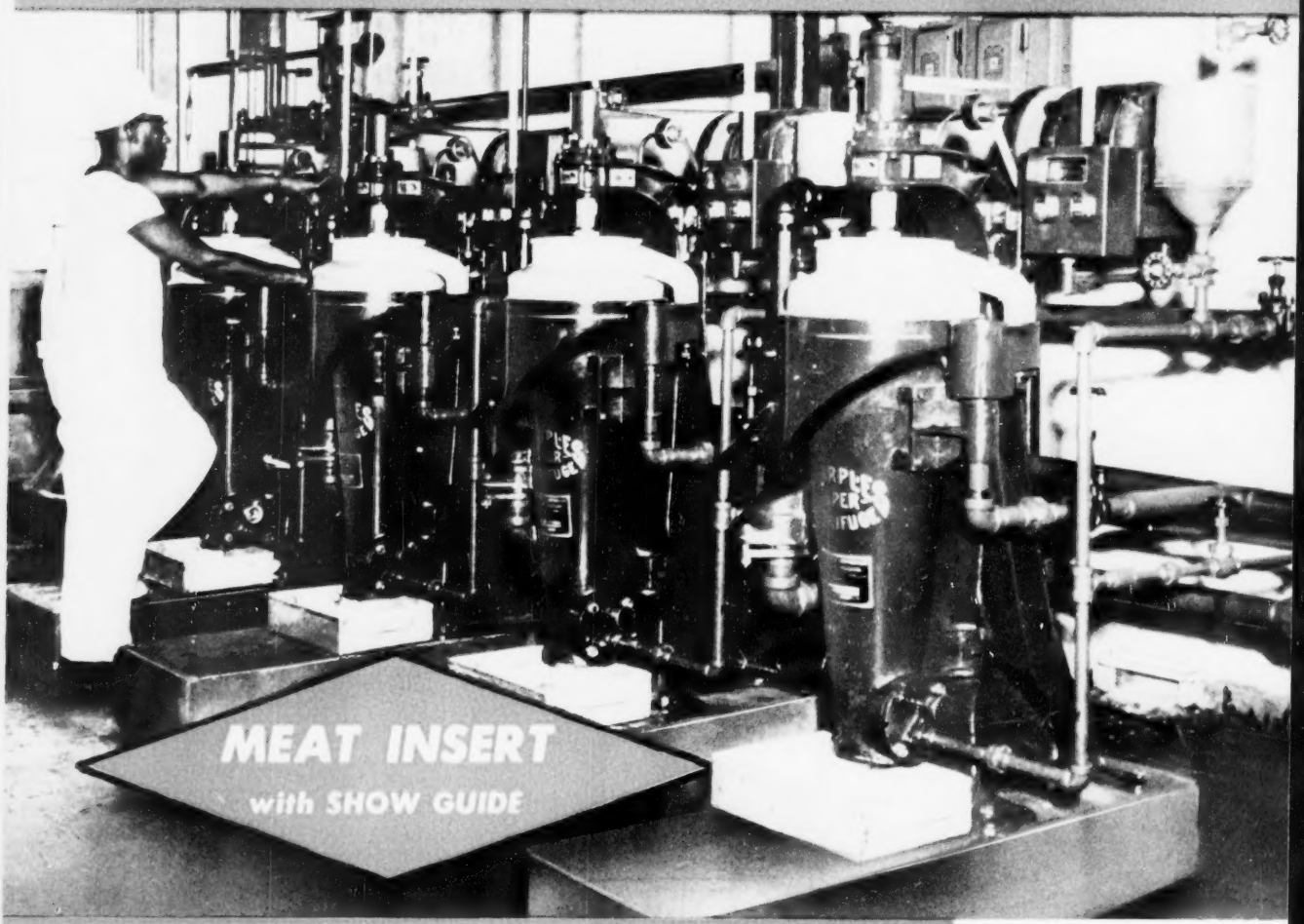
35 CENTS

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*In This Issue:*

lant Colors Pay..... 45
pots Bacteria Fast.. 47
yramid-Pack Milk ... 48
ps Package Freezing 50
New Color Graders. 52
uality Potato Chips . 54
uicker Olive Brining. 57
Curbing Those Insects 58
Freak Bottle "Out!".. 60
To Save—Insulate ... 62
Robots Beer Cases... 67

**MEAT INSERT....69**

Electrostatic Smoking ... 70
Changes Lard Chemistry.. 72
Pools Packaging ..... 74
Fires—Stopped Cold ..... 77
Never Too Old to Improve. 78
High-Speed Accounting... 81
Cutting Cleaning Costs .. 91
Hi-Vac Meat Packager.... 97
Show Plan, Exhibitors.... 99
Modified-Lard Foldout ....102

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. . . for help on your job. It brings needed data on equipment, ingredients, supplies—also useful catalogs. As you read this issue, circle page numbers on

Coupon, Page 157

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# Food Engineering

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INDUSTRY INDEX

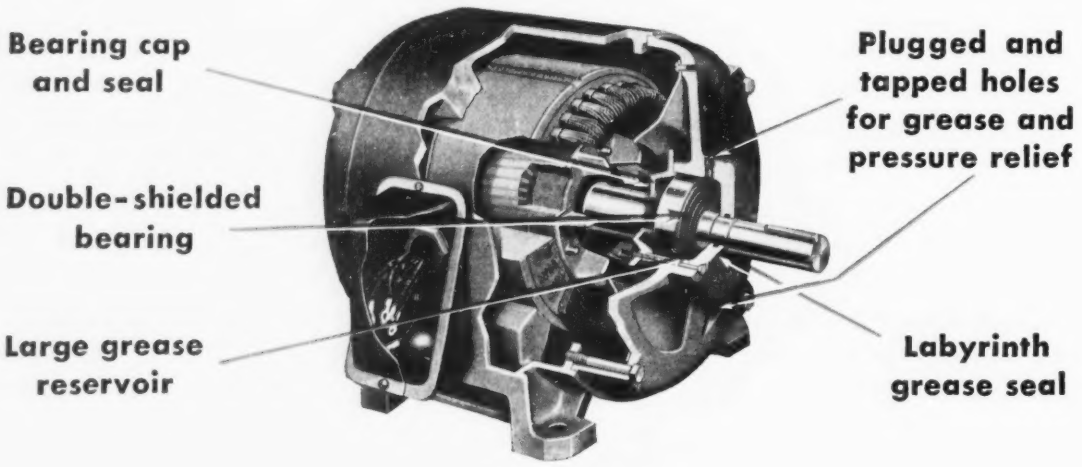

| | | Baking | Beverages | Cereals | Confectionery | Dairy | Fruits, Vegetables | Meats, Fish | Other Foods |
|---|---|---|---|---|---|---|---|---|---|
| **FEATURE ARTICLES** | | | | | | | | | |
| Benefits High With Engineered Plant Colors | 45 | • | • | • | • | • | • | • | • |
| New Bacteria Spotter | 47 | • | • | • | • | • | • | • | • |
| "Pyramid" Paper Bottles Made, Filled Link-Style | 48 | | • | | | • | | | • |
| Western Processors Slash Package-Freezing Costs | 50 | | | | | • | • | • | |
| Color Grading by Electronics | 52 | | | | | | • | | |
| They Bet—And Won With Quality Chips | 54 | | | | | | • | | |
| Faster Brine Making and Filling | 57 | | | | | | • | • | • |
| Tips on Curbing Insects in Plants | 58 | • | • | • | • | • | • | • | • |
| "The Kitten Had to Go" | 60 | | • | | | • | • | • | • |
| Insulating for Food Quality and Savings | 62 | • | • | • | • | • | • | • | • |
| Pimento Canning Gets a Technological Boost | 64 | | | | | • | • | | • |
| Robot Speeds and Eases Case, Bottle Handling | 67 | | • | | | • | | | • |
| Payload Upping Trailer Carriage | 68 | • | • | • | • | • | • | • | • |
| MEAT SPECIAL With Show Guide | 69 | | | | | | | | |
| Electrostatics Create "Flash" Smoking—Coating | 70 | • | | • | • | • | • | • | • |
| Lard Scores Again | 72 | • | | | | | • | • | • |
| Morrell Integrates Its Packaging | 74 | • | | • | | • | • | • | • |
| Stops Fires Before They Start | 77 | • | | • | • | | • | • | • |
| Never Too Old to Modernize | 78 | • | • | • | • | • | • | • | • |
| Cudahy Accounts Electronically | 81 | • | • | • | • | • | • | • | • |
| Streamlined Practices Cut Cleaning Costs | 91 | • | • | • | • | • | • | • | • |
| New Hi-Vac Packager Keeps Meat Longer | 97 | | | | | • | | • | • |
| Show Exhibitors and Floor Plan | 99 | | | | | | | • | |
| Making Molecular-Modified Lard (Flowsheet) | 102 | • | | | | | • | • | • |
| **NEW EQUIPMENT & SUPPLIES** | | | | | | | | | |
| New Vacuum Capper Is Versatile and Sanitary | 159 | | | | | • | | | |
| Liquid-Level Controller Is Sensitive to Foam | 159 | • | • | • | • | • | • | • | • |
| Industrial Vacuum Cleaner Has Protected Motor | 160 | • | • | • | • | • | • | • | • |
| Access Ports Simplify Conveyor Cleaning | 160 | | • | | • | • | • | • | • |
| Magnetic Amplifier Unit Controls Motor Speeds | 161 | • | • | • | • | • | • | • | • |
| Gravimetric Feeder Unit for Smaller Plants | 163 | • | | | • | | | | • |
| Diaphragm Valves Offered in Various Materials | 163 | • | • | • | • | • | • | • | • |
| Sensitivity Controlled on Electronic Relay | 165 | • | • | • | • | • | • | • | • |
| Clamping Attachment Ups Truck's Versatility | 165 | • | • | • | • | • | • | • | • |
| Pump Employs Pressure Fingers to Move Liquids | 167 | • | • | • | • | • | • | • | • |
| Torque-Limiting Clutches Protect Machine Drives | 167 | • | • | • | • | • | • | • | • |
| Two Knob Colorimeter Is Easy to Operate | 169 | • | • | • | • | • | • | • | • |
| Belt Carries Packages on 55 Deg. Slope | 171 | • | • | • | • | • | • | • | • |
| Right-Angle Unit Has Low, Variable Speeds | 171 | • | • | • | • | • | • | • | • |
| Compact Electric Hoist Speedily Lifts Loads | 171 | • | • | • | • | • | • | • | • |
| Light, Transparent Tarpaulins Up Sanitation | 173 | • | • | • | • | • | • | • | • |
| Maintenance Simplified on Walkie Type Truck | 173 | • | • | • | • | | | | • |
| Sanitary Pneumatic Mover for Dry Bulk Materials | 173 | • | • | • | • | | | | • |
| Fast-Acting Germicide Goes Easy on Metals | 175 | • | • | • | | • | • | • | • |
| New Ingredient Replaces Discounted Coumarin | 175 | • | • | | • | • | | | • |
| Catalase Enzyme Has Role in Research | 175 | | • | | | | | • | • |
| **PRACTICAL IDEAS** | | | | | | | | | |
| "Floating Dock" Makes Loading Safe | 5 | • | • | • | • | • | • | • | • |
| Simple Innovations Improve Washer | 5 | | | | | | • | | |
| Handy, Protected Conversion Tables | 7 | • | • | • | • | • | • | • | • |
| Metal Guards Reduce Damage by Truck | 7 | • | • | • | • | • | • | • | • |
| Wire Screen Flights Improve Cooler | 7 | | | | | | • | | |
| Ends Monotony, Ups Efficiency | 7 | • | • | • | • | • | • | • | • |
| Cleaning Compounds in Handy Bins | 9 | • | • | • | • | • | • | • | • |
| Flexible Hose Cuts Bearing Wear | 9 | • | • | • | • | • | • | • | • |
| Heat Savings Easily Checked | 11 | | • | • | • | • | • | • | • |
| New Freezer Insulating Procedure | 11 | • | • | • | • | • | • | • | • |
| Ends Pump "Air Bending" | 11 | • | • | • | • | • | • | • | • |
| Fat Loss Cut by Milk Sampling Device | 13 | | | | | • | | | |
| Protects Both Guests and Workers | 13 | • | • | • | • | • | • | • | • |
| Speeds Cleaning of Jar Filler | 13 | | • | | • | • | • | • | • |
| **OTHER DEPARTMENTS** | | | | | | | | | |
| In Behalf of Progress | 176 | • | • | • | • | • | • | • | • |
| New Packages & Products | 182 | • | • | • | • | • | • | • | • |
| Advances in Technology | 193 | • | • | • | • | • | • | • | • |
| Questions & Answers | 202 | • | • | • | • | • | • | • | • |
| Useful New Books | 212 | • | • | • | • | • | • | • | • |
| Keeping Up With Field | 215 | • | • | • | • | • | • | • | • |
| Output & Price Index | 216 | • | • | • | • | • | • | • | • |
| Hors d'Oeuvres | 217 | • | • | • | • | • | • | • | • |
| Schedule of Events | 220 | • | • | • | • | • | • | • | • |
| Recent Inventions | 222 | • | • | • | • | • | • | • | • |
| Men & Companies | 224 | • | • | • | • | • | • | • | • |
| Just Off the Press | 228 | • | • | • | • | • | • | • | • |
| Reader Service | 157 | • | • | • | • | • | • | • | • |
| Advertisers Index | 238 | • | • | • | • | • | • | • | • |

# Here Are Facts You Should Know About

# Electric Motor Bearings

An ideal motor bearing would operate for indefinitely long periods under all types of conditions without requiring any attention whatever. However, in the opinion of our engineers, such a bearing and its attendant lubricant are not yet available on the commercial market. Consequently, bearings for many types of operations, particularly where overloading, extreme temperature ranges and chemical and dirt laden atmospheres are involved, require special lubricants or regular lubrication schedules.

Of course, bearings suitable for many kinds of operation under normal conditions can be built to require no attention for very long periods — usually several years. Allis-Chalmers can supply sealed bearings in all frame sizes through 505 on short delivery and without extra cost for applications of this type.


Bearing cap and seal
Double-shielded bearing
Large grease reservoir
Plugged and tapped holes for grease and pressure relief
Labyrinth grease seal

## Which is the Best Design for *Your* Application?

***We believe that the design used in standard Allis-Chalmers drip-proof, tefc and explosion-proof motors represents the best design for most industrial users.***

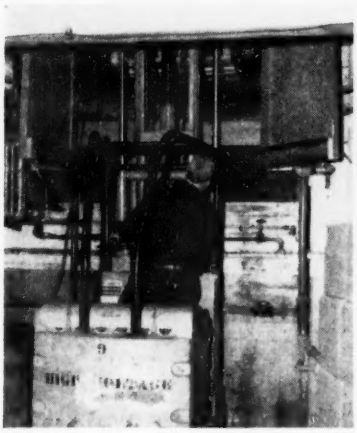
The Allis-Chalmers standard design consists of a pre-lubricated, double-shielded bearing mounted in the end housing with a generous grease reservoir. Plugged and tapped holes are provided for grease and for pressure relief. Under normal operating conditions, this design will operate as long without attention as any other type of bearing in use today. But where difficult operating conditions make re-lubrication desirable, it can be done as part of the normal lubricating-routine without dismantling the motor.

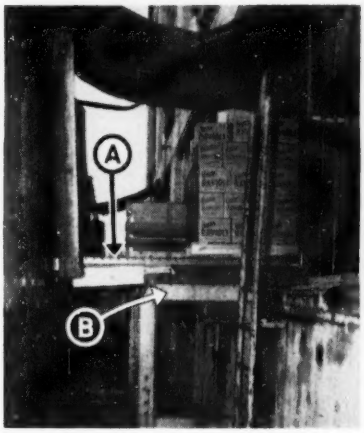
The large grease reservoir and shielded bearing design assure that grease lost from the bearing due to high operating temperatures or other causes will be replaced automatically.

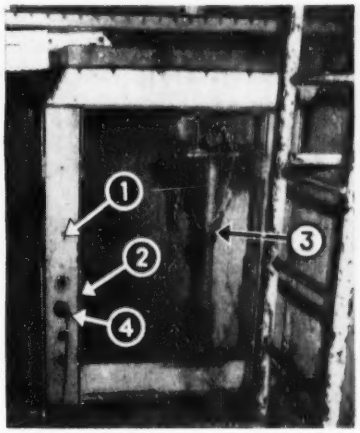
For further information on bearing design and other features of Allis-Chalmers motors, call your nearby Allis-Chalmers District Office or Authorized Distributor. A-4130

**ALLIS-CHALMERS**

# PRACTICAL IDEAS






## "Floating Dock" Makes Loading Safe

Delivering cases to rail cars from our track-side, basement warehouse was a near-impossible procedure until we made slight building alterations and installed loading docks of our own design.

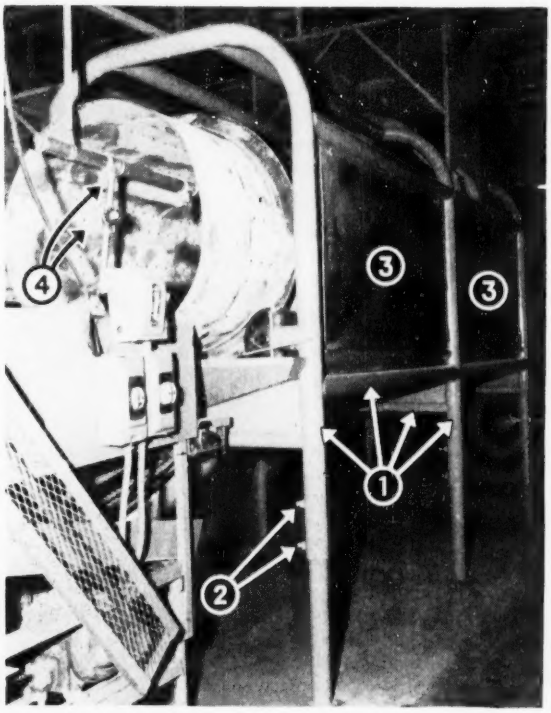
First, openings were cut in basement ceiling allowing access to rail siding from level of floor above. Then opening was walled on three sides. Doors (see left photo), opening in, provide access from basement to car siding, and the areaway resulting from the construction permits elevating a case-loaded pallet by fork truck to a height allowing transfer of the pallet to the rail car.

Next step was to improvise an easy means of executing this transfer.

A roller conveyor—(A) in center photo—seemed ideal, but only if travel into car was down-hill. Otherwise, pallet would roll back and crash to basement level, damaging products and possibly causing injury to employees.

Since car door level varied, provision was necessary to adjust dock-side level of the conveyor to an elevation above car-opening level. This was done by constructing a hydraulically lifted "floating dock" (B).

Siding platform was constructed on solid metal bars—(1) in right photo—which travel in channel-iron guides (2). Hydraulic lifts (3) on either side of dock are simple, inexpensive types. When platform is raised to satisfactory height, providing conveyor tilt to rail car door, a steel pin (4) (attached to a chain to prevent loss) is inserted in matching holes to carry the load when pressure is released on the lift.—*A. W. Machamer, Chief Engineer, Chef Boy-Ar-Dee Div., American Home Foods, Inc., Milton, Pa.*




## Simple Innovations Improve Washer

At least four features of the fruit and vegetable washer we designed and installed in our plants are noteworthy:

1. Unit is constructed more ruggedly than are conventional washers, particularly the frame.
2. Supports and outside structure are easier to clean.
3. Washer supports can be adjusted easily to vary height and pitch of washer.
4. Rotary cylinder is gentle with product, efficient as washer and also is readily kept clean.

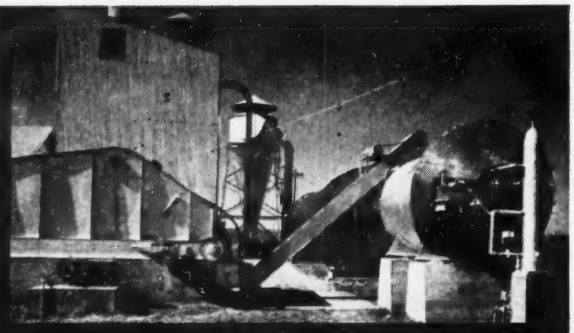
Angle-iron, normally used in washer construction, was replaced by heavy metal tubing (1) in photo. Frame not only has great strength, but is also free of recesses, difficult to wash and keep sanitary.

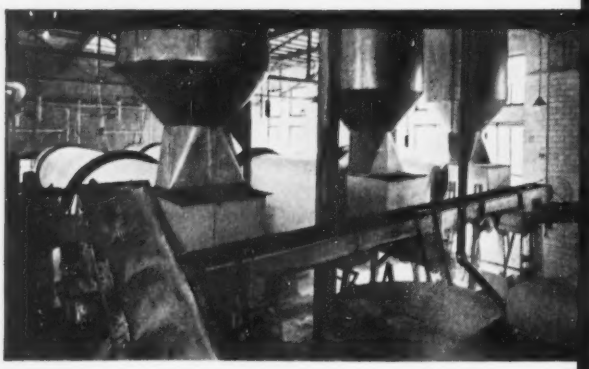
Legs, supporting washer frame, are fabricated in two sections, lower telescoping into upper. By means of a pair of set-screws (2) on each leg, assembly can be raised and lowered or angle of tilt varied.

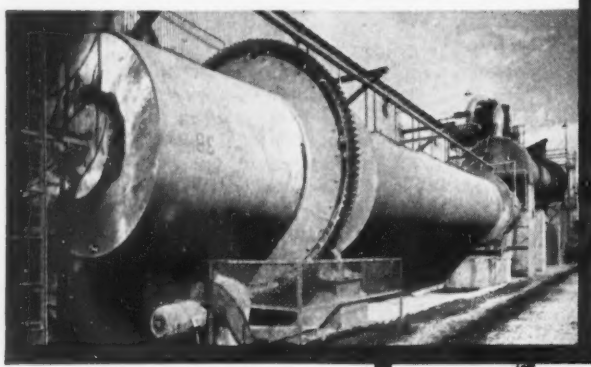
Ready access to rotating drum is obtained by removing stainless steel sides (3). This is accomplished merely by removing a pair of wing-nuts on each section, and lifting sides from a bottom slot or groove.

No difficult-to-clean longitudinal plates or angle-iron strips protrude inside rotary washer. Instead, ample tumbling is obtained by slight V-shaped elevations (4) in shell itself. All surfaces are flat, smooth and easily cleaned. Furthermore, holes drilled in surface between V-elevations, provide ample drainage for wash water.—*Charles Bowman, Gerber Products Co., Freemont, Mich.*

**more than 50 years of experience in designing and building dryers for industry...**







# Louisville dryers

**used throughout the world for great efficiency with low maintenance**

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GENERAL AMERICAN
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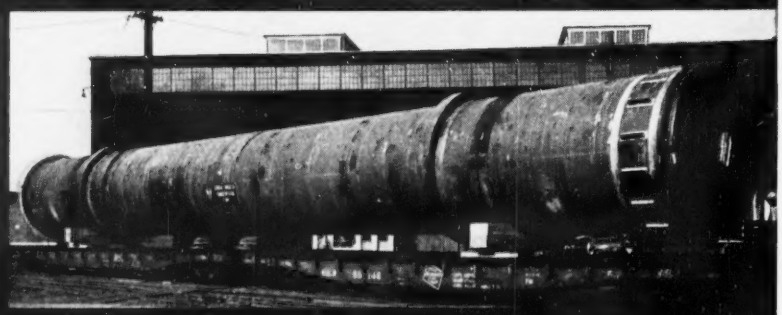
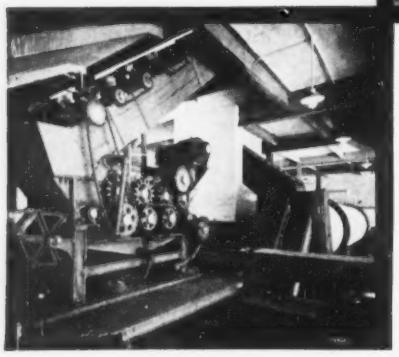
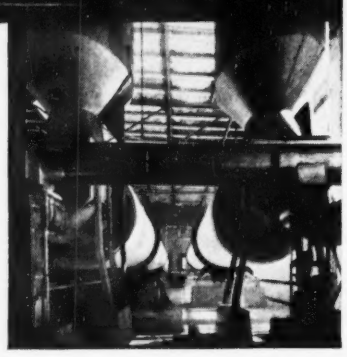




**KNOW THE RESULTS BEFORE YOU BUY**

Louisville engineers will test your dryer needs in our laboratory. When required, a pilot model will be checked in your plant before full-size dryers are built.

Louisville's creative engineering pre-determines results for you!

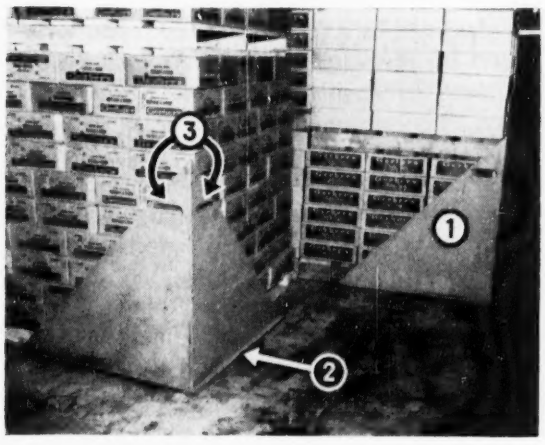


## Handy, Protected Conversion Tables

In our laboratory, as in most, it is frequently necessary to refer to conversion tables such as that for reading specific gravity into percent alcohol. Though such tables are available in reference texts, when frequently used they become worn, torn and soiled.

If a copy is typed or written in long hand, it too, soon becomes lab-worn, if not lost or misplaced. However, framing a typed copy under glass (see photo), as we have done with tables required for repeated reference, keeps them clean, provides long life and avoids misplacing or accidentally discarding them.

If frame is made with grooves along each vertical side outside glass, a slide can be inserted to speed use of table with assured accuracy.—*Raymond S. Fillers, Chief Chemist, Garrett & Co., Brooklyn.*




## Metal Guards Reduce Damage By Truck

In many warehouses, trucks, when backing or turning from one aisle into another, sometimes smash cases at the corner of stacks.

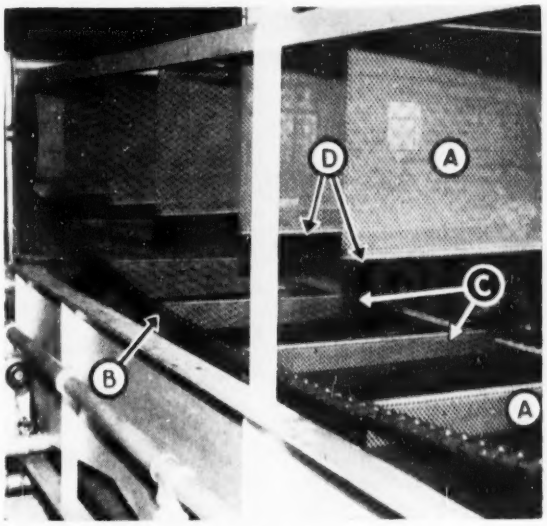
In the warehouses of Gerber Products Co. case and product damage is greatly avoided now that corners of palletized stacks are protected by metal guards.

These guards are simple to construct and furthermore are inexpensive.

Sheet metal is cut in shape of an isosceles triangle, with sides approximately 2 ft. in length. Then sheet is bent to form 2 ft.-long sides—(1) in photo—at right angles. Height will be same. Next, bottom of each side is flanged (2) to provide base and reinforcement.

To facilitate moving and placing guard, hand holes (3) are cut near top of both sides.

If they are painted with a color that provides contrast, guards will not only protect cases but serve as aisle and passageway markers and guides.—*FE Staff.*




## Wire Screen Flights Improve Cooler

Cooling of asparagus and other vegetables was made more efficient when we redesigned our cold water bath to employ wire screen flights—(A) in photo—suspended from heavy chain (B) to advance product through unit.

Attached to metal rods (C) suspended across the drive chains, the flexible screens are held vertical in cooler by other heavy rods (D) secured to their bottoms.

Three major advantages are gained by this construction:

1. Slowly advancing screens do not break or bruise vegetables, nor cause undue turbulence of water in bath.

2. Counter-flow of cooling water to product movement can be realized with minimum interference from flights, and increasing cooling effect.

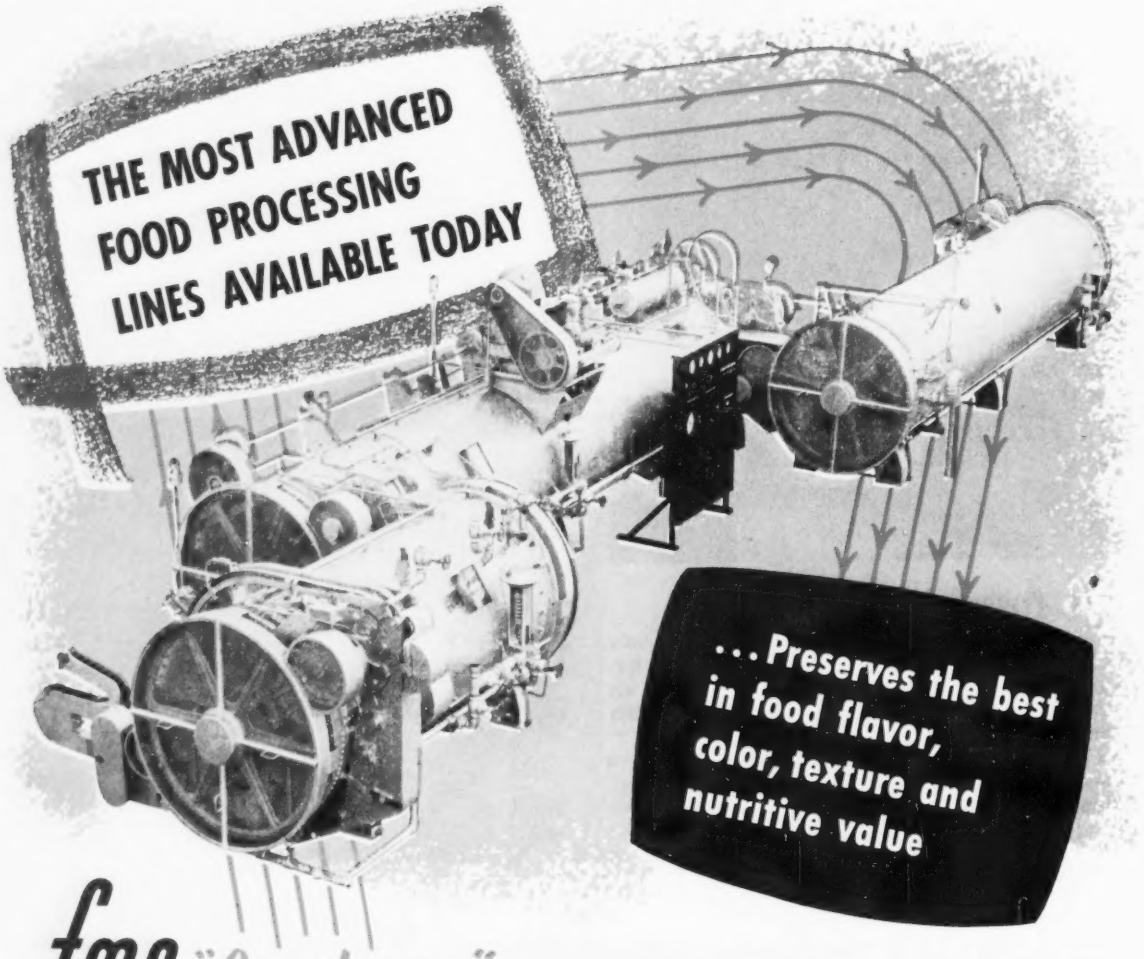
3. Since bath time can be controlled by regulating speed of flights with a variable speed drive, and since flow of cold supply water can be varied, cooling rate may also be regulated.—*L. M. Jordan and Dorsey Davis, Phillips Packing Co., Cambridge, Md.*

## Ends Monotony, Ups Efficiency

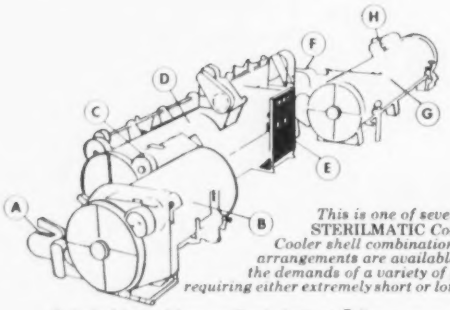
Shifting workers from one bottling line operation to another every 30 minutes at Stroh Brewing Co., Detroit, has had several advantages.

First of all, frequent shift of occupation wards off boredom and bars monotony from daily routine. General employee morale is lifted and efficiency increased.

Another advantage has been that every man on the line has become proficient at every operation, providing flexibility among employees and compensating for absenteeism. *FE Staff.*


THE MOST ADVANCED FOOD PROCESSING LINES AVAILABLE TODAY
...Preserves the best in food flavor, color, texture and nutritive value

# fmc "Sterilmatic" PRESSURE COOKER and COOLER




*This is one of several FMC* STERILMATIC *Cooker and Cooler shell combinations. Other arrangements are available to meet the demands of a variety of products requiring either extremely short or long cooks.*

**A** Left side positive cup-feed elevator, **B** Pressure pre-heater, **C** Pre-heater discharge valve, **D** Pressure cooker, **E** Central control panel, **F** Micro-cool valve, **G** Atmospheric cooler, **H** Discharge turret.

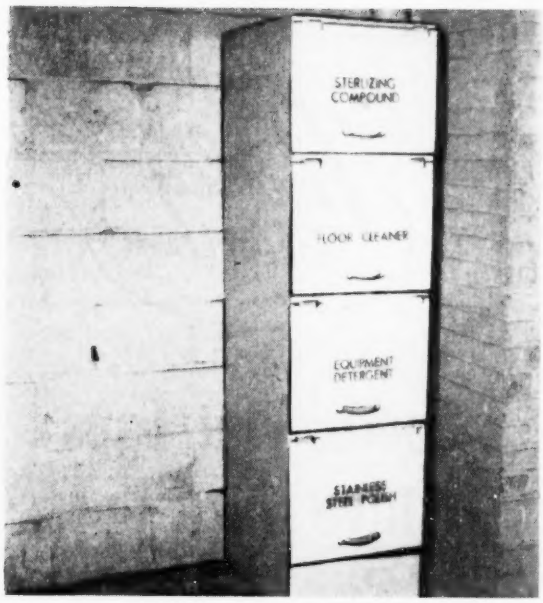
High-speed *STERILMATIC* Cooker and Cooler lines give canners the *precise processing control* needed to maintain their high standard of product quality and uniformity. This continuous, automatic equipment cooks every can *evenly*—cooks every can *exactly alike.* The natural flavor, color, texture and essential vitamins of farm-fresh fruits and vegetables are protected and preserved at their peak of harvest perfection. And these qualities last, too—locked in to be fully enjoyed when the can is opened and the product served. Write for full information on FMC's outstanding "one-man cook room," or call your nearest FMC representative.

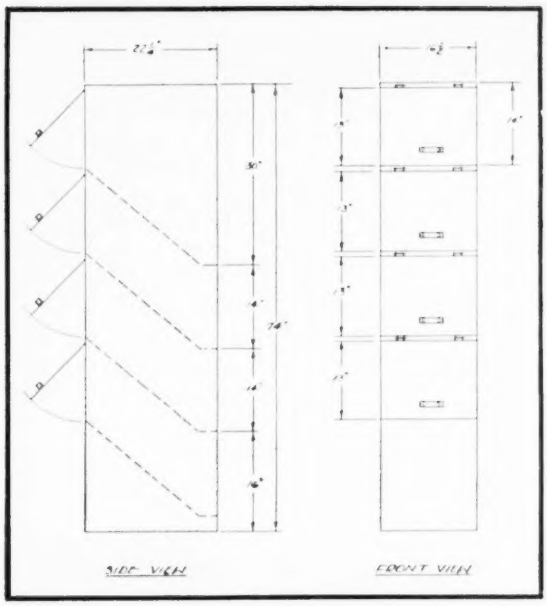
**FOOD MACHINERY AND CHEMICAL CORPORATION**

*Canning Machinery Division*

**General Sales Offices:**

**WESTERN:** SAN JOSE 6, CALIFORNIA **EASTERN:** HOOPESTON, ILLINOIS



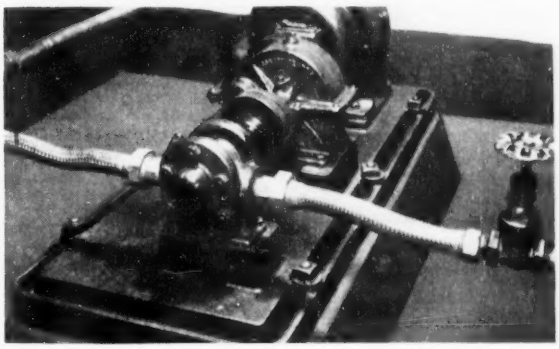




## Cleaning Compounds in Handy Bins

Everyone realizes that if materials are stored as close as possible to the areas in which they are used, a more efficient operation will result. In the average bottling plant, as well as other food plants, this principle is followed quite generally in storing ingredients, containers, and machinery parts. However, because of the disorder which often develops around drums, pails, and bags containing cleaning compounds, these items are usually stored in some inconvenient, out-of-the-way place.

By building a suitable storage bin (see sketch), cleaning compounds can be placed near point of use, without detracting from area appearance. This particular bin has four compartments for storage of cleaning chemicals—each compartment holding approximately 100 pounds of material. Door covering each bin swings outward and upward and is properly labeled (see photo) for convenience and to prevent error. Convenient directions for use of material are printed on back of each door. Other possible errors are avoided by placing a suitable measuring cup in each bin.

Four-compartment bin is neat and requires very little space. It saves time in procuring materials and it makes a favorable impression on those who visit the plant. An important effect on the maintenance crew is the encouragement to keep the plant in order at all times.—*H. E. Korab, Technical Service Director, American Bottlers of Carbonated Beverages, Washington, D. C.*



## Flexible Hose Cuts Bearing Wear

Alignment of pumps at Wheatena Corp., Rahway, N. J. was often distorted when couplings were tightened on pipeline intake or discharge to stop frequent leaks. Misalignment then caused bearing wear.

When solid pipe was replaced with Titeflex flexible metal hose (see photo), bearing wear due to misalignment, ceased. Bearing repacking is now required less often and general pump maintenance has been reduced.—*FE Staff.*

## $50 Extra for Best Item

**You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month, you will get an additional payment of $50.**

**Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).**

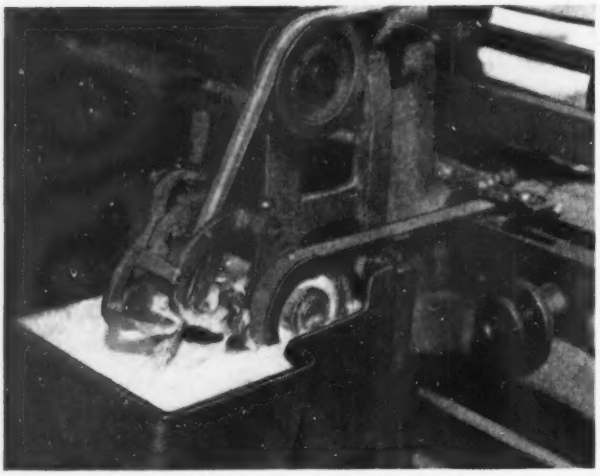
**Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.**

**You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.**

**Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.**

**JULY PRACTICAL IDEA voted best was "Cooling Aided by Air Mixing," submitted by J. C. Monk, Chief Engineer, Golden State Co., Ltd., Los Banos, Calif. Described was use of air agitation while lowering temperature of water by means of direct expansion refrigeration coils. Air movement around coils prevents water from freezing on them, also improves heat transfer.**

LABELING CANS ON STANDARD KNAPP LABELING MACHINE



SHOWING PAISLEY LAP BELT PASTE IN ACTION

SHOWING SIZES OF PAISLEY LUMP HOT PICK-UP GUM

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Paisley Laboratories have developed a remarkable team of Adhesives for can labeling machines. Whatever the equipment or container temperatures, there's a Paisley Adhesive specially designed to give you the greatest possible labeling speed, efficiency, and economy.

Improve appearance, step up production and cut costs with these *better,* more uniform Paisley Adhesives. It will pay you to have complete technical data and information about newest can labeling methods and machinery. The Paisley Technical Service Bulletin No. 16 gives you all the facts—send for it now!

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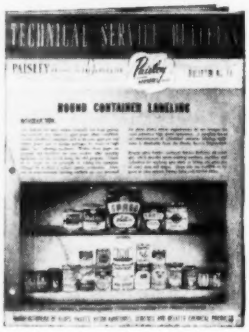
*This 8-page Round Container Labeling Bulletin, fully illustrated and punched for 3-ring binder, tells you how to achieve clean, neatly labeled, salable containers at low cost. Just tear this ad, clip it to your letterhead, indicate your name and mail to us now. Your free copy of this helpful bulletin will be sent along at once.*

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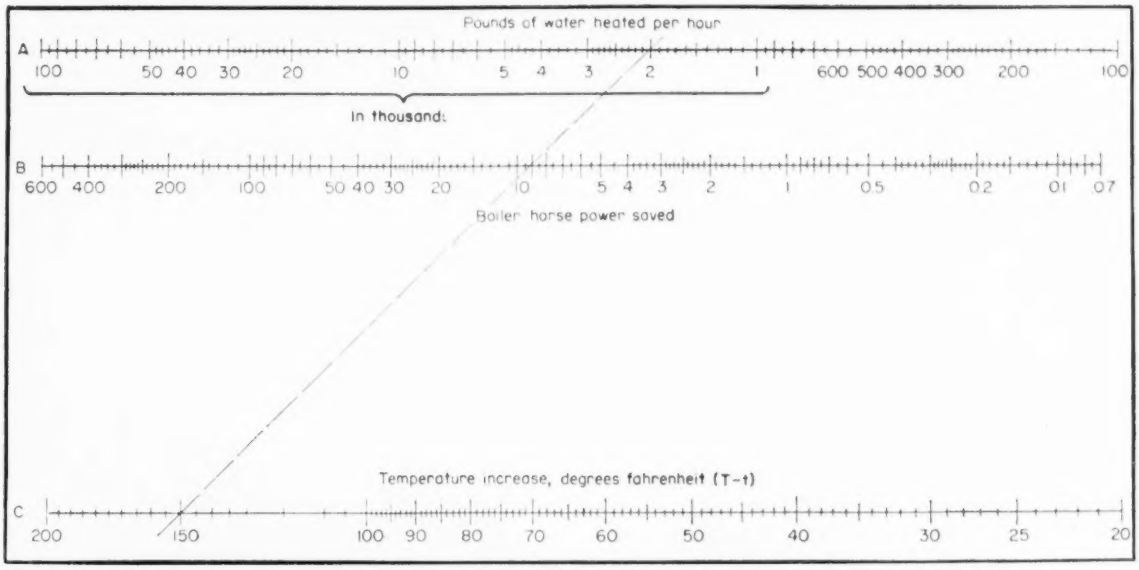
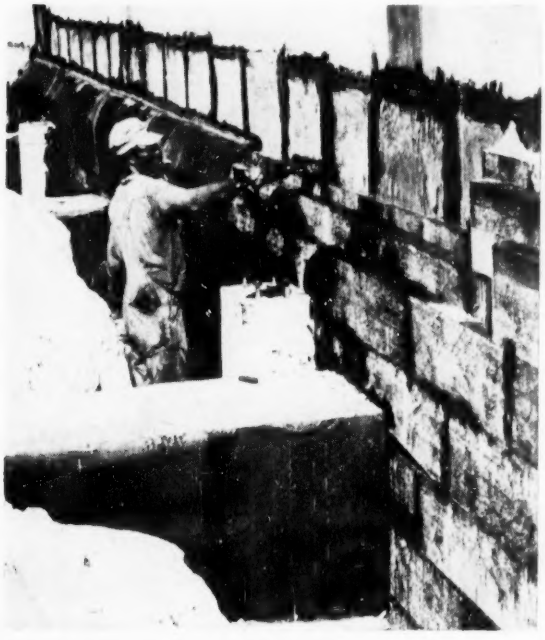

Pounds of water heated per hour
A
100 50 40 30 20 10 5 4 3 2 1 600 500 400 300 200 100
In thousands
B
600 400 200 100 50 40 30 20 10 5 4 3 2 1 0.5 0.2 0.1 0.7
Boiler horse power saved
Temperature increase, degrees fahrenheit (T-t)
C
200 150 100 90 80 70 60 50 40 30 25 20

## Heat Savings Easily Checked

Would you like to know how much boiler HP any of your heat exchangers are using, or if you are exhausting steam somewhere in your plant, would you care to determine heat recovered in terms of BHP by an exchanger?

Here's an easy route to both answers:

Select on Scale A in chart, pounds liquid per hr. to be heated by exhaust steam. Then, on Scale C, designate temperature to which fluid is to be raised. Now, connect two points with a straightedge to determine at the intersection of straight edge with Scale B the boiler horsepower that is required or saved.—*W. F. Schaphorst, Newark, N. J.*



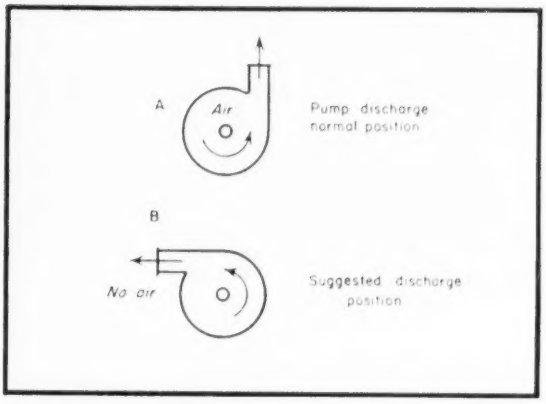
## New Freezer Insulating Procedure

Newly erected refrigerated warehouse of Minute Maid Corp., at Leesburg, Fla., with frozen juice storage capacity equivalent to 1000 rail cars, is insulated throughout with moisture, rot and mildew resistant, non-flammable material, Fiberglas.

Insulation is applied in slabs, two 4-in. layers on walls, each layer successively impaneled on knife-like clips secured to furring strips. Thus, erecting labor is minimized, fire hazard reduced, and construction speeded. Roof application was also stepped-up by spreading 8-in. layer over entire roof top instead of against ceilings of storage rooms.

To minimize heat transfer from minus 10 deg. rooms to earth beneath, 3 layers of asphalt enclosed insulating boards were applied to foundations to depth of 6 ft. (see photo).

Last layer, inside finish over insulating boards is $\frac{1}{8}$ in.-thick perforated tempered hard-board, held in place by bent-over ends of impaneling clips.




## Ends Pump "Air Bending"

Time lost removing air from centrifugal pumps to restore lost "prime" should be considered a needless waste of man-hours. This is particularly true when a pump is in use intermittently.

All that is necessary to end "air bending" is to shift

Take a closer look at the

# MACHINABILITY

of B&W mechanical tubing

*You'll like it*

You'll find the machining characteristics of B&W Mechanical Tubing make it adaptable for turning out hollow cylindrical parts with any type of machine tool on mass production or jobbing basis. You can get this versatile tubing in grades, tempers, finishes and sizes to suit any combination of production conditions and product specifications. And no matter what analyses you need—carbon, alloy or stainless steels—to get the desired physical properties in your finished machined parts, B&W can supply them.

You'll find Mr. Tubes—your nearby B&W Tube Representative—a good man to consult when you need help in determining the best available mechanical tubing for your specific requirements.

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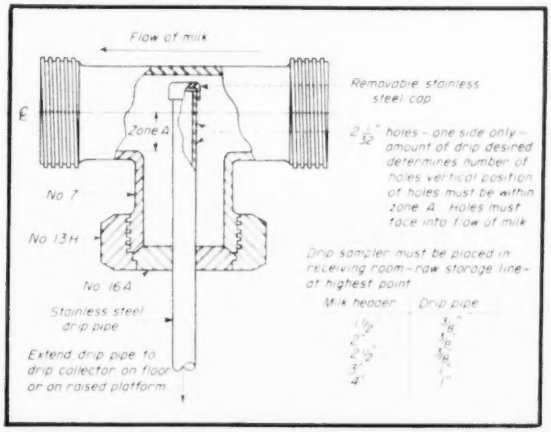
TA-1751(M)

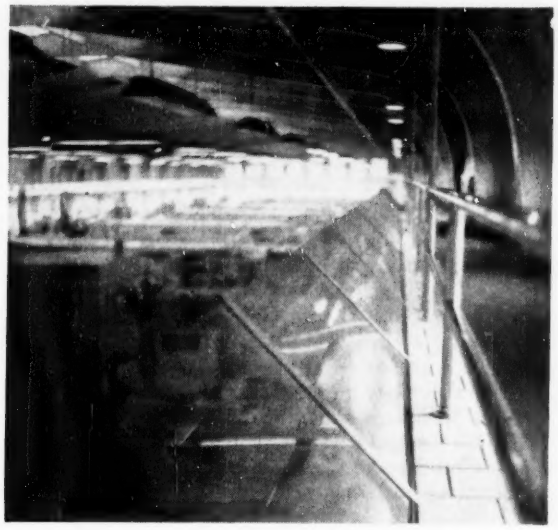
the normally vertical pump discharge over to a horizontal position.

When a pump's discharge is vertical—(A) in sketch—air is trapped in pump housing. When pump discharge is horizontal (B), air can no longer collect in housing but instead will escape into discharge pipe where it cannot cause bending.—*J. L. Oliphant, Sales Engineer, Cherry-Burrell Corp., Toronto, Ont.*


Flow of milk
Removable stainless steel cap
Zone A
2 1/32" holes - one side only - amount of drip desired determines number of holes vertical position of holes must be within zone A. Holes must face into flow of milk
No 7
No 13H
No 16A
Stainless steel drip pipe
Extend drip pipe to drip collector on floor or on raised platform
Drip sampler must be placed in receiving room - raw storage line - at highest point
Milk header
Drip pipe
1 1/2
2
2 1/2
3
4
3/8
1/2
3/4
1
1 1/4

## Fat Loss Cut by Milk Sampling Device

An accurate means of drawing composite samples of daily receipts and individual loads of milk is provided by the sampling device which is explained in detail in the sketch presented above—*FE Staff.*



## Protects Both Guests and Workers

At Stroh Brewing Co., Detroit, the bottling plant was especially designed to display operation to visitors. Tours through the plant are conducted over an elevated balcony overlooking bottling line operations and extending the length of the building.

To eliminate any accident hazard to workers or product from falling objects, a safety-glass baffle (see photo) was projected from floor of balcony at a 45 deg. angle. Visitors' view is not impaired and, if some person drops watch or glasses while leaning over the rail, they would not smash on the floor below.

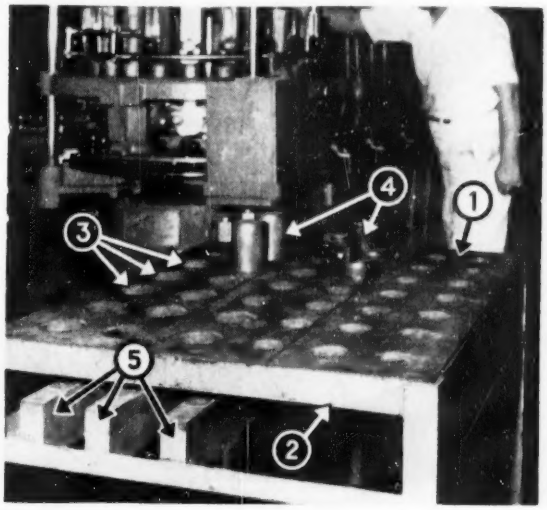
Not only does glass shield protect workers and product from falling material but also those on balcony from flying glass when bottles break.

Shield is simply constructed. The 2½ ft. wide sheets of glass are held firmly but shock free in rubber gaskets in aluminum frames. Latter are clamped to and supported by the side of balcony.

### And Runway Aids Safety

Installation of an elevated runway along an entire side of this same brewer's Detroit bottling plant has had two major advantages. Bottle-house worker-safety has been improved and confusion in bottling department has been reduced.

Handrail safeguarded runway is elevated 3 ft above floor, with steps leading to the aisles between bottling lines. Employees use runway entering or leaving bottling plant, thus do not congest areas near production lines. Nor are they subject to accidents resulting from production line area traffic.—*FE Staff.*




## Speeds Cleaning of Jar Filler

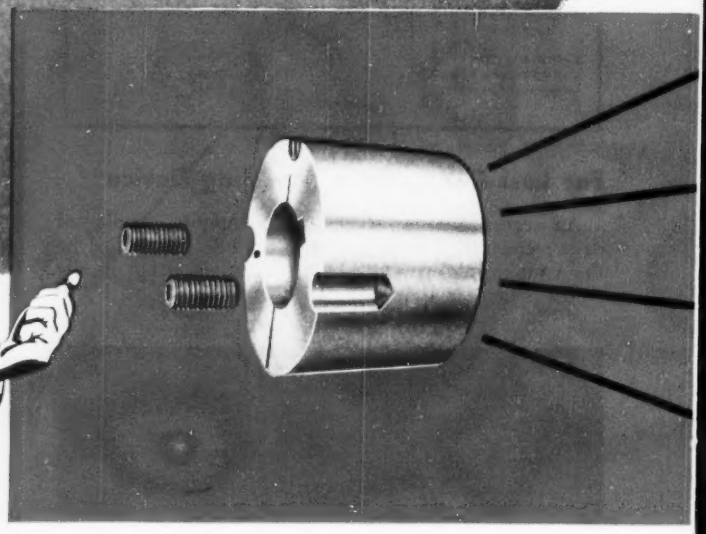
Use of a specially designed parts table not only speeds cleaning of our jar filling machine and detachable mechanism but also decidedly minimizes danger of injury to the latter units.

Top of table is made of removable 3 in. planks—(1) in photo—which rest in an angle-iron frame (2) supported at convenient height on metal legs. Holes (3) are cut in the planks to correct diameter for each of machine's working parts (4) removed during clean-up.

To provide a rest for parts which otherwise might fall through holes in table surface, supporting timbers (5) are employed as cross-members beneath certain groups of openings.

With this handy table to receive machinery parts as they are taken from filler and cleaned, mislaying or losing units is unlikely. In holder, all items are easily checked. Contact of parts with wood causes no denting, scratching or marring of surfaces such as results when close-tolerance mechanisms are piled on floor or shelf. Disassembly and reassembly is speeded since every part has its own location on table—*Correl Morton and Wm. Nixon, Gerber Products Co., Freemont, Mich.*

# Now-Standardize on TAPER-LOCK



Now, for the first time, you can have all the benefits of standardizing on a truly modern method of mounting wheels on shafts . . . through the famous Dodge patented Taper-Lock design.

The time-saving, cost-cutting performance of Dodge Taper-Lock . . . already proved in millions of installations of Taper-Lock Sheaves, Couplings and Conveyor Pulleys . . . is now available in a complete line of Taper-Lock Sprockets with Dodge Roller Chain.

The bushing pictured here fits into the hub of every one of the Dodge products shown—sprockets, sheaves, couplings, conveyor pulleys. Both tapered bushings and hubs are precision machined to achieve perfect interchangeability. The result is less down-time on machines, simpler maintenance, reduced inventories. Taper-Lock gives you an unmatched opportunity to lower your costs and keep production rolling.

Dodge Taper-Lock grips the shaft for the full length of the bushing—holds with the firmness of a shrunk-on fit, yet comes off easily, quickly.

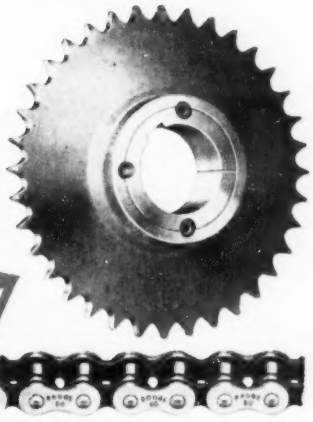
Taper-Lock's exclusive advantages were never more strikingly proved than in the new line of sprockets recently introduced by Dodge. For Taper-Lock brings to sprockets a new "off-the-shelf" availability. No time-consuming and costly reboring, key seating, drilling and tapping for set screws, needed to fit them to the shaft! Dodge Taper-Lock is available in both driver and driven sprockets from No. 40 to No. 100, up to 112 teeth. Taper-Lock bushings to fit shafts from ½" to 10" are available from stock.

Consider carefully the cost-saving advantages you get by standardizing on Taper-Lock — the modern method of mounting wheels on shafts. For further information, call your Dodge Distributor, or write the factory.

**DODGE MANUFACTURING CORPORATION,** 2800 Union Street, Mishawaka, Indiana

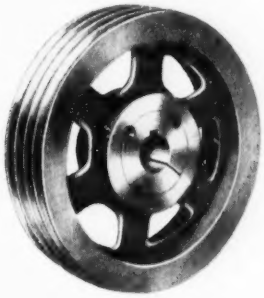


For more information, use coupon on page 157.



**TAPER-LOCK SPROCKETS** and Dodge Quality Roller Chain

— THE MODERN WAY TO MOUNT SPROCKETS



**TAPER-LOCK SHEAVES**

— THE MODERN WAY TO MOUNT SHEAVES

**TAPER-LOCK COUPLINGS** Rigid and Flexible

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**CALL THE TRANSMISSIONEER,** your local Dodge Distributor. Factory-trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified phone book.

**DODGE**

of Mishawaka, Ind.



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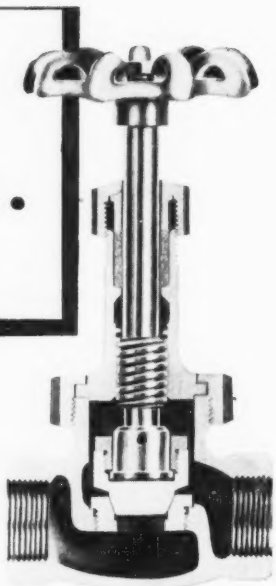
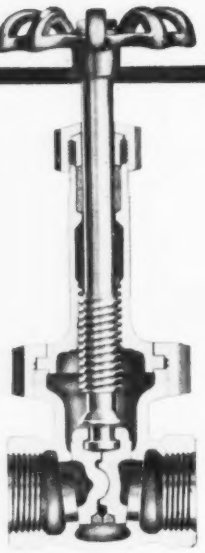
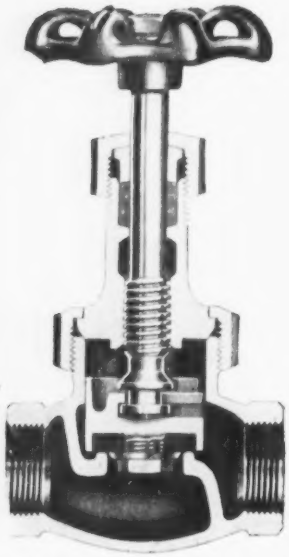
# Walworth bronze valves...



Walworth No. 225P Globe Valve
500 Brinell Seat and Disc



Walworth
No. 29 Gate Valve



Walworth No. 95 Globe Valve
Re-New-Disc

## built to give dependable trouble-free service on all recommended jobs

Walworth No. 95 Bronze Globe Valves (Angle Type: No. 96) are recommended for service where throttling is not required. They are rated at 150 psi working steam pressure, 500F; 300 psi cold water, oil or gas. The improved renewable disc and lock-on, slip-off disc holder — an original Walworth development—saves time and trouble. This valve can be repacked under pressure when fully opened. All parts are designed to give maximum service and strength.

Walworth No. 29 Bronze Gate Valves are rated at 200 psi working steam pressure, 550F; 400 psi cold water, oil and gas. These valves have rising stems and integral seats. Sizes 2-inch and smaller have union bonnets; sizes 2½ and 3-inch have bolted bonnets. Valves up to and including ¾-inch have solid wedge discs; 1-inch and larger have split wedge discs. These valves can be repacked under pressure when fully opened.

Walworth No. 225P Bronze Globe Valves (Angle Type: No. 227P) are rated at 350 psi working steam pressure, 550F; and 1000 psi non-shock service on cold water, oil and gas. The stainless steel, plug type seat and disc — heat treated to 500 Brinell — can be closed on sand, slag, scale and similar floatage, without injury to the seating surfaces. They are the longest wearing, TOUGHEST bronze valves you can buy.

For full information about Walworth Quality Bronze Valves, see your Walworth distributor, or write:

**WALWORTH**
**valves and fittings**

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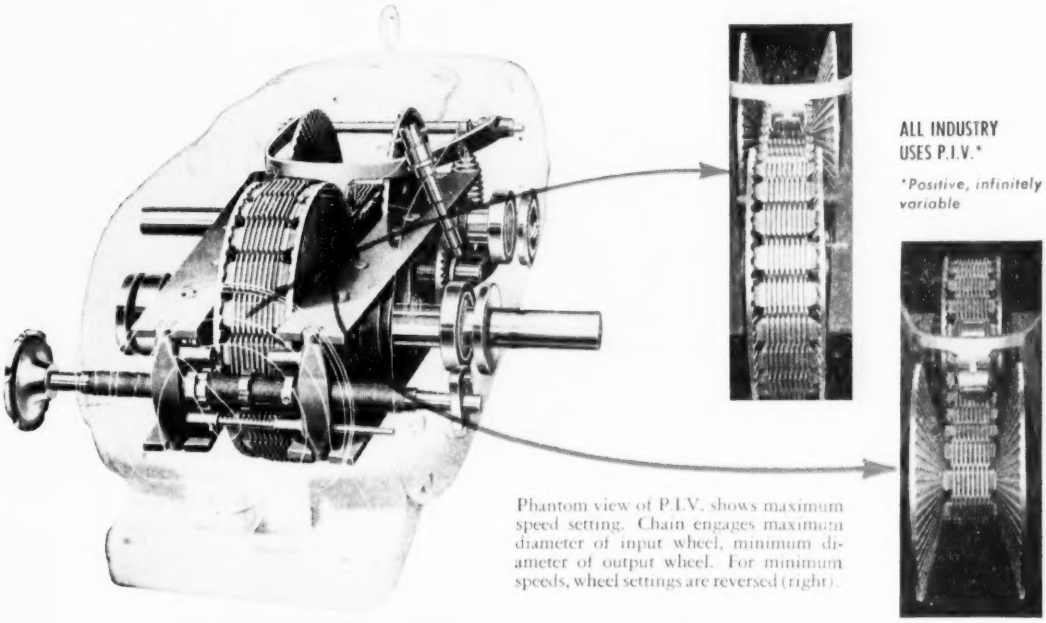
## How you can get speed changing that's

# truly POSITIVE
# truly STEPLESS



ALL INDUSTRY USES P.I.V.*

*Positive, infinitely variable

Phantom view of P.I.V. shows maximum speed setting. Chain engages maximum diameter of input wheel, minimum diameter of output wheel. For minimum speeds, wheel settings are reversed (right).

## LINK-BELT's P.I.V. operates independent of friction ... gives you exact selection of an infinite number of speeds

TURN a hand wheel . . . push a button . . . or utilize fully-automatic controls. Link-Belt's P.I.V. Variable Speed Drive provides the speed you need—without stopping the machine. Speed changing is positive, stepless—accurate under full load. Speed choice is infinitely selective, effortless and precise.

P.I.V. is not dependent on friction for power transmission. Link-Belt's exclusive self-tooth-forming chain meshes with grooved wheels to assure positive power transmission at all speeds. Full-rated horsepower is constantly delivered to your machines.

If your manufacturing processes demand variable speed control, get all the facts about these compact P.I.V. Variable Speed Drives. There's an experienced power transmission engineer in the Link-Belt office near you. Call him today. Send for Catalog No. 2274.

LINK-BELT

P.I.V. VARIABLE SPEED DRIVE

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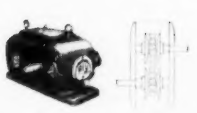
### 4 of 16 P.I.V. types you can choose from. ½ to 25 hp . . . ratios to 6:1



Basic P.I.V. Like all others, it is built for horizontal or vertical mounting.

P.I.V. with single reduction input or output helical gears.

Motorized P.I.V. with single reduction input and output helical gears.

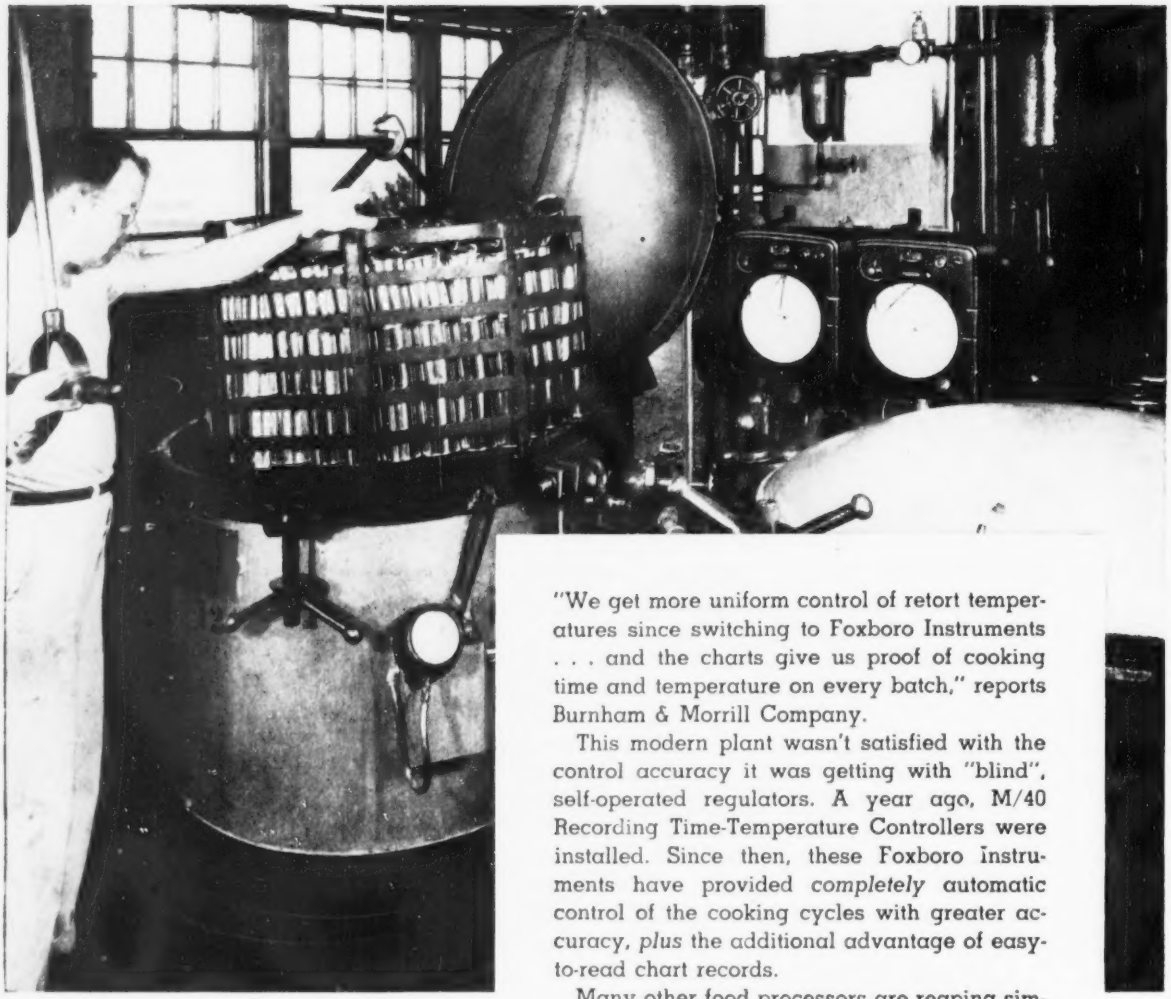
Motorized P.I.V. with single reduction input and double reduction output helical gears.



For more information, use coupon on page 157.

# B&M gets "MORE UNIFORM CONTROL"

## . . . with Foxboro Automatic Temperature Controllers



Two of the 24 Foxboro Time-Temperature Controllers now giving better retort operation at Burnham & Morrill Company, Portland, Me.

"We get more uniform control of retort temperatures since switching to Foxboro Instruments . . . and the charts give us proof of cooking time and temperature on every batch," reports Burnham & Morrill Company.

This modern plant wasn't satisfied with the control accuracy it was getting with "blind", self-operated regulators. A year ago, M/40 Recording Time-Temperature Controllers were installed. Since then, these Foxboro instruments have provided *completely* automatic control of the cooking cycles with greater accuracy, *plus* the additional advantage of easy-to-read chart records.

Many other food processors are reaping similar benefits from Foxboro Measurement and Control Systems. Write today for information that will improve your production, or see your Foxboro Field Engineer.

THE FOXBORO COMPANY, 309 NEPONSET AVENUE, FOXBORO, MASSACHUSETTS, U.S.A.

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INSTRUMENTS THAT IMPROVE PRODUCT UNIFORMITY

FACTORIES IN THE UNITED STATES, CANADA, AND ENGLAND

# POCO HTB GREASE hangs on through HEAT and WET!

**Proves usefulness over wide range of temperature and moisture conditions.**

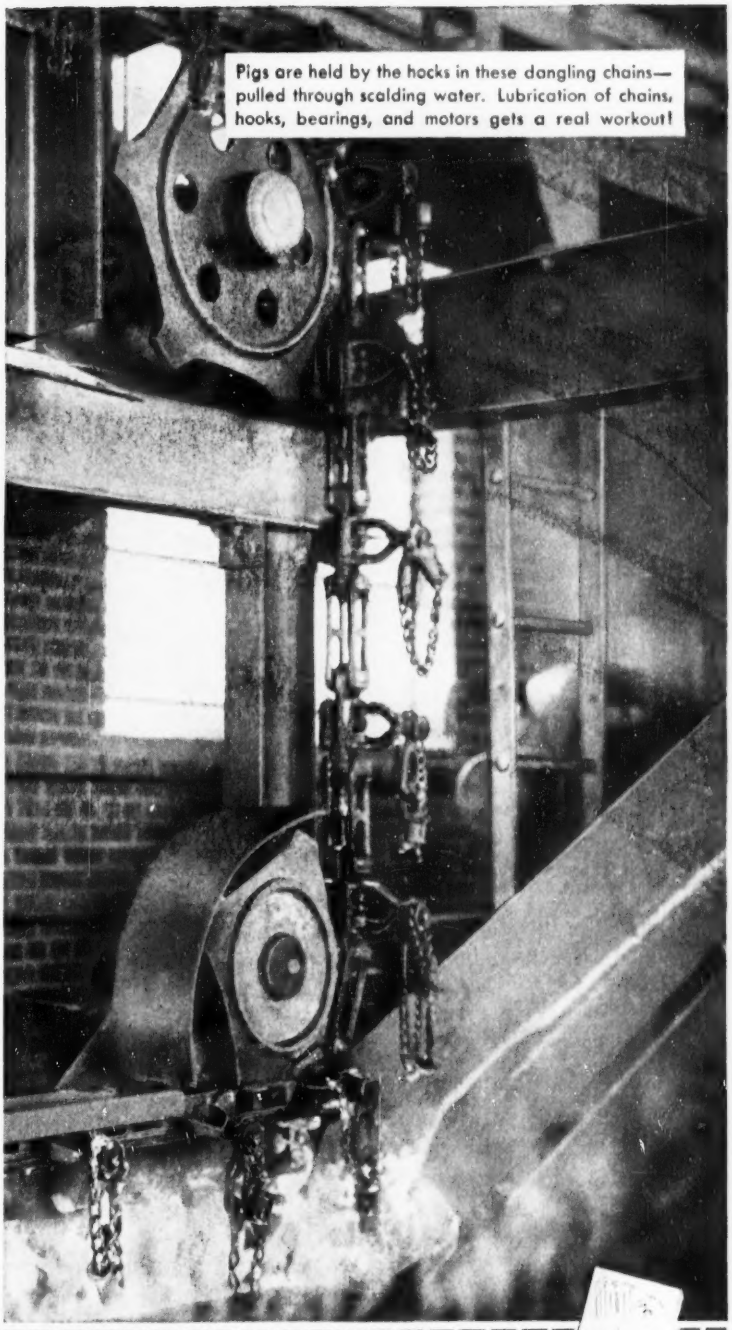
In meat packing plants, as in many others, POCO HTB Grease is widely used with outstanding success as a general purpose lubricant. High film strength and adhesiveness over a wide range of temperature and moisture conditions make this possible.

POCO HTB is one of a group of Pure Oil multi-purpose industrial lubricants that you can turn to advantage to simplify your lubrication practice—and reduce your lubricants inventory.

Find out more about this versatile compact line of oils and greases designed to do so many jobs equally well. In most plants no more than six lubricants are needed to do the entire lubrication job with complete success. By reducing the number of lubricants used in your plant to six or less, you can slash application costs, minimize waste and error.

Tear out that coupon now and mail it today. You'll get full details on how to start a new labor-saving, money-saving, lubrication program in your plant.

*KEEP IT PURE, AND SIMPLE!*



Pigs are held by the hocks in these dangling chains—pulled through scalding water. Lubrication of chains, hooks, bearings, and motors gets a real workout!

PURE OIL INDUSTRIAL LUBRICANTS

## FREE BOOKLET

The Pure Oil Company, Industrial Sales Dept. H-39
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Please send me your free booklet on how to "Simplify and Save".

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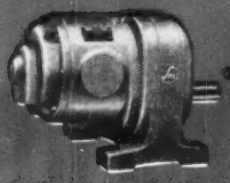
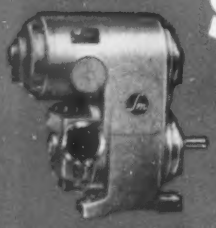
# NATION-WIDE STERLING SERVICE...

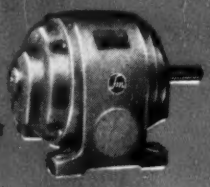


SLO-SPEED GEARED LOW SPEED



SPEED-TROL VARIABLE SPEED

*in more than 150 cities to serve your electric power drive needs ...wherever you are*



KLOSD CONSTANT NORMAL SPEED

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**ALABAMA**
**BIRMINGHAM** Birmingham Electric & Mfg. Co.
**DECATUR** Decatur Electric Service Co.
**FLORENCE** Fortney Electric Co.
**MOBILE** Russell Electric Company, Inc.
**MONTGOMERY** Standard Electric Co.
**TUSCALOOSA** Eddie's Elec. Motor Service

**ARIZONA**
**LOWELL** Copper Electric Company, Inc.
**PHOENIX** Daley Electric Company
**PHOENIX** Motor Rewinders
**SAFFORD** Valley Electric & Machine Co.
**TUCSON** Pima Electric Company

**ARKANSAS**
**FORT SMITH** [illegible] Service Company
**LITTLE ROCK** [illegible] Electric Company
**PINE BLUFF** [illegible] Equip. Service Co.

**CALIFORNIA**
**BAKERSFIELD** Elec. Motor Sales & Serv.
**BLYTHE** Jay O. Dance Electric
**BRAWLEY** Doyle Electric Company
**CORNING** Neuhardt Electric
**FRESNO** Blackstone Electric Motor Shop
**GRASS VALLEY** Sierra Elec. Motor Serv.
**LOS ANGELES** Gory Electric Service
**LOS ANGELES** Larsen-Hogue Elec. Co.
**MARYSVILLE** Kinney Electric
**MODESTO** Industrial Electric Company
**OAKLAND** T. L. Rosenberg Company
**OCEANSIDE** The Electric Motor Service
**PASADENA** Pompey Elec. Motor Service
**POMONA** Pomona Elec. Mach. Co., Inc.
**RED BLUFF** Red Bluff Industrial Elec.
**RIVERSIDE** Backstrand Brothers
**SACRAMENTO** Williams Electric Service
**SALINAS** Quality Electric Company
**SAN DIEGO** Bay City Electric
**SAN JOSE** Kurze Electrical Works
**SANTA CRUZ** Coast Electric Motor Service
**SANTA ROSA** Leete Electric Motor
**STOCKTON** Stanley Electric Motor Co.
**VENTURA** [illegible]field Electric Company
**WATSONVILLE** P & H Elec. Motor Works
**WILMINGTON** [illegible] Hokin & Galvan
**WOODLAND** Industrial Motor Electric

**COLORADO**
**DENVER** Tree Electric Service
**DENVER** Weaver Electric Company
**FORT COLLINS** Al Pennock Electric Motor Service

**CONNECTICUT**
**BRIDGEPORT** Electric Motor Sales & Service
**NEW BRITAIN** Monarch Electric Co.
**NEW HAVEN** G. E. Wheeler Company

**DELAWARE**
**WILMINGTON** McHugh Electric Company

**DISTRICT OF COLUMBIA**
**WASHINGTON, D. C.** Carty Electric & Armature Service, Inc.

**FLORIDA**
**MIAMI** Peninsular Armature Works
**PANAMA CITY** West Florida Elec. Service

**GEORGIA**
**ATLANTA** Cleveland Electric Company
**MACON** Electric Repairs, Inc.
**SAVANNAH** Electric Motor Service Co.

**IDAHO**
**BOISE** L & K Electric Motor Co.
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**CHICAGO** Lehman Electric Company
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**PEORIA** Hendricks Electric Company
**QUINCY** Electric Motor Repair Co.
**ROCKFORD** Rockford Industries, Inc.
**ROCK ISLAND** Torrance Elec. Co., Inc.

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**EVANSVILLE** Flanders Elec. Motor Serv.
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**CEDAR RAPIDS** Electric Motors Co., Inc.
**DAVENPORT** Industrial Engineering & Equip. Co.
**DES MOINES** Electric Equip. Co., Inc.
**DUBUQUE** Dubuque Electric Motor Serv.
**MARSHALLTOWN** Egleston Electric Co.
**MASON CITY** Zach Bros. Electric
**SPENCER** Pixler Electric Co.

**KANSAS**
**GARDEN CITY** Motor Electric Shop
**GREAT BEND** [illegible] Electric Co., Inc.
**HUTCHINSON** Hilton Electric Company
**SALINA** Mid-States Armature Works, Inc.

**KENTUCKY**
**LOUISVILLE** Krauth-Campbell Electric Company, Inc.
**MADISONVILLE** Whitfield Electric Co.

**LOUISIANA**
**ALEXANDRIA** Alexandria Armature Co.
**LAFAYETTE** Hub Armature Works
**LAKE CHARLES** Gulf Armature Company
**MONROE** Poulan's Electrical Company
**NEW ORLEANS** New Orleans Armature Works
**SHREVEPORT** Shreveport Armature & Elec. Works

**MAINE**
**BREUER** Leen's Electric Motor Service

**MARYLAND**
**BALTIMORE** Keystone Electric Co., Inc.
**HAGERSTOWN** Hagerstown Equip. Co., Inc.

**MASSACHUSETTS**
**BOSTON** Sandman Electric Co., Inc.
**BOSTON** Skillings Electric Company
**PITTSFIELD** Elec. Supply & Repair Co., Inc.
**SPRINGFIELD** Superior Electric Co., Inc.
**WORCESTER** Alfred L. Brown Assoc., Inc.

**MICHIGAN**
**BATTLE CREEK** Electric Motor Company
**DETROIT** Michigan Electric Motors Co.
**DETROIT** Miller-Seldon Electric Company
**KALAMAZOO** Kalamazoo Elec. Motor Serv.
**LANSING** [illegible] D. Hayes Co.
**MUSKEGON** Whittaker Electric Company
**PONTIAC** Hodges Pump & Motor Company
**PORT HURON** [illegible] Electric Co.
**SAGINAW** Lange-Seaman Elec. Co.

**MINNESOTA**
**MINNEAPOLIS** Boustead Elec. & Mfg. Co.
**ST. PAUL** Commonwealth Electric Co.

**MISSISSIPPI**
**JACKSON** Power Electric Company

**MISSOURI**
**JEFFERSON CITY** Linsenbardt Electric Co.
**KANSAS CITY** Independent Electric Machinery Company
**KANSAS CITY** Kornfeld-Thorp Elec. Co.
**SPRINGFIELD** Springfield Elec. Serv. Co.
**ST. LOUIS** Carl J. Schaefter Elec. Co.
**ST. LOUIS** Interstate Electric Co., Inc.

**MONTANA**
**MISSOULA** Industrial Electric Co.

**NEBRASKA**
**BEATRICE** Sprague Electric Service, Inc.
**COLUMBUS** Overturf Electric Motors
**GRAND ISLAND** Motor Engineering Works
**KEARNEY** Industrial Electric Service
**LINCOLN** Colin Electric Motor Serv. Co.
**OMAHA** Omaha Electrical Works

**NEW HAMPSHIRE**
**MANCHESTER** Cohen Machinery Co., Inc.

**NEW JERSEY**
**EAST RUTHERFORD** Standard Electric Motor Repair
**FREEHOLD** Blain Electric Motor Shop
**LINDEN** Standard Elec. Motor Repair Co.
**PATERSON** Lyons Electric Company, Inc.
**SOMERVILLE** Electric Motor Service
**TRENTON** Electrical Motor Repair Co.
**WOODBURY** [illegible] Electric Motor Repair Co.

**NEW MEXICO**
**ALBUQUERQUE** [illegible] Electric Corp.
**CARLSBAD** [illegible] Sauncier Electric Co.

**NEW YORK**
**AUBURN** Auburn Armature Company
**BATAVIA** Secord Electric Corp.
**BUFFALO** Lang Electric Co., Inc.
**JAMESTOWN** Elec. Motors Service Co.
**NEW YORK** Premier Elec. & Eng. Co.
**ROCHESTER** O. G. Schwarz Company
**STATEN ISLAND** Jedco Electrical Co.
**SYRACUSE** Murray Electric Company
**UTICA** Mather Evans & Diehl Co., Inc.

**NORTH CAROLINA**
**CHARLOTTE** Jones Electric Repair Co.
**CHARLOTTE** Southern Elec. Service Co.
**GREENSBORO** Southern Elec. Ser. Co.
**RALEIGH** Elec. Motor & Repair Co.
**ROCKY MOUNT** Hammond Electric Co.

**OHIO**
**CHILLICOTHE** Duffy Electric Company
**CINCINNATI** Barkley Electric Company
**CINCINNATI** The Sullivan Elec. Co.
**CLEVELAND** Center Elec. Service Co.
**LIMA** Lima Armature Works, Inc.
**MANSFIELD** Phoenix Electric Co.
**MARION** Marion Elec. Motor Service, Inc.
**NEW PHILADELPHIA** Fenton Bros. Electric
**SPRINGFIELD** The B & M Electric Co.
**TOLEDO** Romanoff Elec. Motor Service
**ZANESVILLE** Reliable Elec. & Equip. Co.

**OKLAHOMA**
**ENID** Walker Electric Company
**MUSKOGEE** [illegible] Electric Company
**OKMULGEE** [illegible] & Electric Co.
**OKLAHOMA CITY** Southwest Electric Co., Inc.
**TULSA** Bartlett Electric Co.

**OREGON**
**EUGENE** Kalen Elec. & Machine Co.
**KLAMATH FALLS** Ray Bigger Elec. Equip.
**NEWBERG** Gibbs Electric Company
**PORTLAND** Reed Electric Company
**ROSEBURG** Ridenour Electric Company
**SALEM** Walton Brown Electric Company

**PENNSYLVANIA**
**ALLENTOWN** H. N. Crowder, Jr., Company
**ALTOONA** H. D. Force Co.
**EASTON** Stokes Engineering & Supply Co.
**ERIE** Erie Electric & Machine Co.
**LANCASTER** Fidelity Electric Company
**NORRISTOWN** Coleman & Schmidt
**PHILADELPHIA** Atlantic Elec. Motors Co.
**PHILADELPHIA** J. J. Smith Elec. Motor Co.
**PITTSBURGH** Electric Mfg. & Repair Co.
**POTTSTOWN** Mellon Engr. Co.
**READING** Standard Elec. Service Corp.
**WILLIAMSPORT** G. I. Electric Company

**RHODE ISLAND**
**PAWTUCKET** New England Machine & Electric Company
**PROVIDENCE** Walco Elec. Products Co.

**SOUTH CAROLINA**
**GREENVILLE** Southern Elec. Service Co.
**SPARTANBURG** Southern Elec. Service Co.

**TENNESSEE**
**KNOXVILLE** Tennessee Armature & Electric Company
**MEMPHIS** Frank Stevens Electric Co.
**NASHVILLE** Electrical Machinery & Supply Company

**TEXAS**
**BEAUMONT** Elec. Machinery & Repair Co.
**CISCO** Ashton Electric Company
**CORPUS CHRISTI** Bradleys Motor & Armature Works
**FORT WORTH** Warriner Electric Shop
**HOUSTON** Roy A. Bernotz Company, Inc.
**HOUSTON** Texas Armature Works
**LUBBOCK** Lubbock Electric Company
**LUFKIN** Elec. Machinery & Repair Co.
**McALLEN** McAllen Armature Works
**SAN ANTONIO** Electric Motor Service & Sales Co.

**UTAH**
**SALT LAKE CITY** Schraga Electric Co.

**VERMONT**
**BARRE** Cushman Electric Co.

**VIRGINIA**
**NORFOLK** Virginia-Carolina Electrical Works, Inc.
**RICHMOND** Elec. Motor & Repair Co.
**ROANOKE** Cloyd Electric Company
**STAUNTON** Johnson Electric Company

**WASHINGTON**
**ABERDEEN** Industrial Elec. Service Co.
**EPHRATA** Gardner Electric
**LONGVIEW** Longview Electric
**MOUNT VERNON** Mount Vernon Electric Motor Service
**OKANOGAN** H. H. Hall Motor Shop
**SEATTLE** Seattle Electric Works
**SPOKANE** Tinling & Powell
**WALLA WALLA** Berry Electric Company
**WENATCHEE** Pacific Electric Service
**YAKIMA** Cooper Elec. Motor Service Co.

**WEST VIRGINIA**
**CHARLESTON** Charleston Elec. Sup. Co.
**CLARKSBURG** Barnes & Brass Electric Co.
**WHEELING** Whitney Electric Co.

**WISCONSIN**
**APPLETON** Kurz Electric Service Co.
**GREEN BAY** Beemster Electric Company
**KENOSHA** Hammes Electric Motors Co.
**MILWAUKEE** Elec. Sales & Engr. Co.

**WYOMING**
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# STERLING ELECTRIC MOTORS

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# "Naturally," Food Sells Better...

## When You Sell

## NATURAL FRESH FLAVOR

### *intensified by* Zest®

ZEST brings out the true garden-fresh flavor that nature put *into* your vegetables . . . prevents the gradual "flavor-fading" that may be robbing your brand of profit-making taste appeal. Step up quality with fuller flavor. Add ZEST, Staley's 99+% pure monosodium glutamate, to your canned and frozen vegetables, soups, fish, stews, poultry . . . and scores of other foods.

ZEST intensifies natural flavor *already in* your foods without adding flavor, aroma or color of its own. Freezing reduces the level of amino acids. ZEST restores this loss. ZEST is effective in tiny amounts either before, during or after processing. After using ZEST, food processors instantly notice a marked flavor improvement. Write today for all the details about the seasoning that makes foods sell better!

Zest®

PRODUCTS FROM CORN
Staley's

*Staley's 99+% Pure Monosodium Glutamate*

**A. E. Staley Manufacturing Co., Decatur, Illinois**

**Mail this coupon for the complete ZEST story.**

A. E. Staley Mfg. Co.
Dept. FE-9, Decatur, Illinois

Gentlemen: Send me all the facts about ZEST—the amazing seasoning that boosts natural food flavors.

*Name* _____

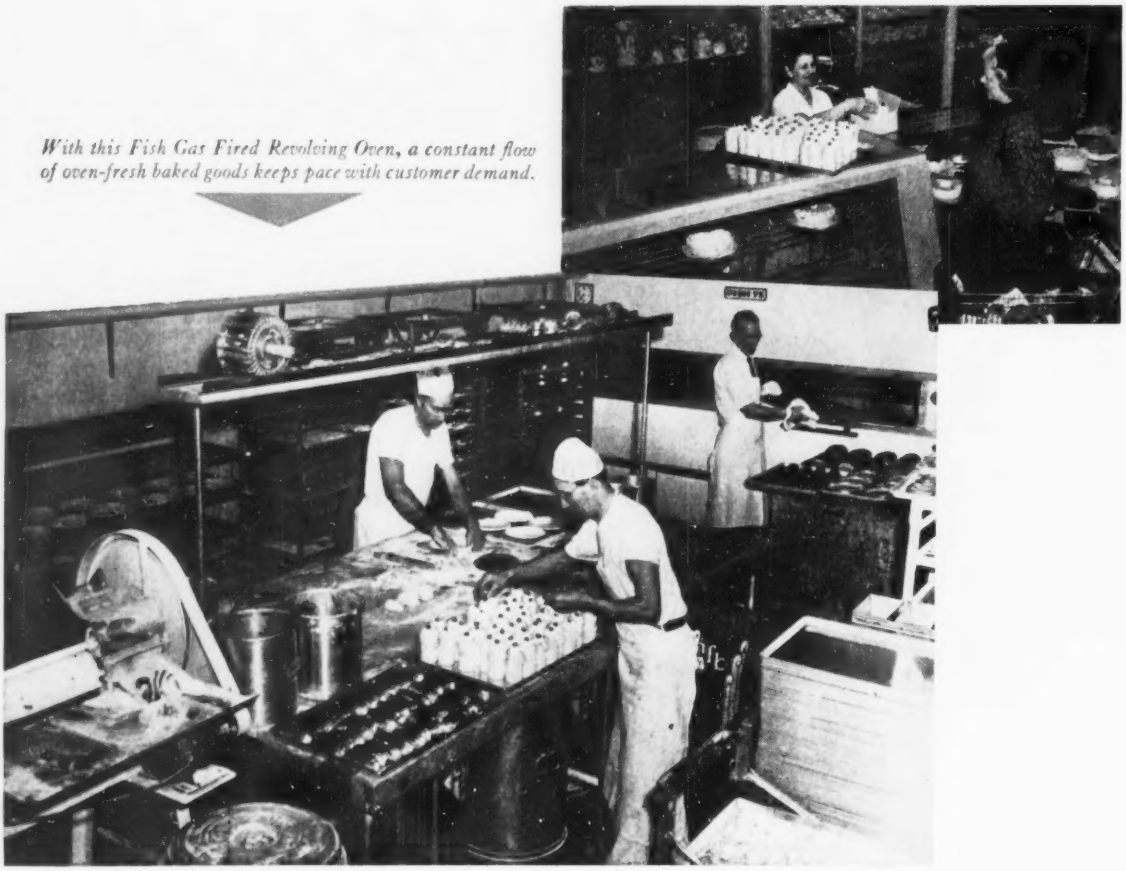
*Address* _____

*City* _____ *Zone* ____ *State* _____



For more information, use coupon on page 157.

# How GAS helps a small and flexible bakery keep pace with supermarket buying habits



*With this Fish Gas Fired Revolving Oven, a constant flow of oven-fresh baked goods keeps pace with customer demand.*

The Fred P. Rapp Supermarket in St. Louis has its own bakery right on the premises. Because of this location, it is entirely different from most neighborhood bakeries. The bakery counter must be ready to serve the supermarket customer with her modern shopping habits. And, since biggest sales are in the afternoon and evening, the bakers concentrate on late morning and early afternoon baking.

GAS and Gas Fired Equipment helps meet these demands. A Gas Bake Oven operates 12 hours each day. In this way, the bakers keep a constant flow of oven-fresh bread, rolls, pastries, cakes and other specialty and variety baked goods . . . and assure the customer of premium quality merchandise.

Wherever Modern Gas Baking Equipment is in operation, you'll find similar outstanding results. Bakers from coast to coast agree that the flexibility, economy, and dependability of GAS make their operation more efficient. If you're among the few who aren't using GAS already, why not call your Gas Company Representative right away for more information on where GAS may help you improve your bakery operation.

MORE AND MORE . . . THE TREND IS TO GAS FOR COMMERCIAL BAKING

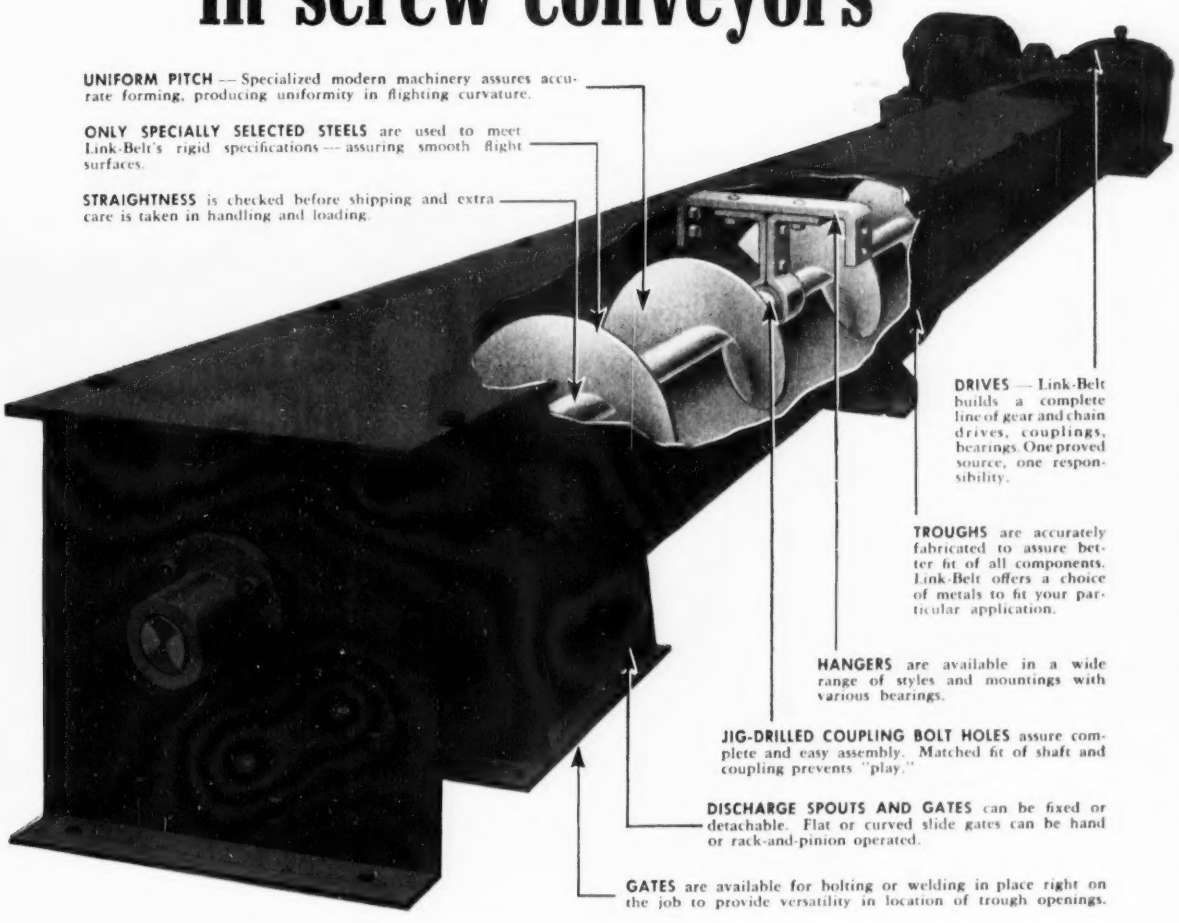
**AMERICAN GAS ASSOCIATION**

*420 LEXINGTON AVENUE, NEW YORK 17, NEW YORK*



For more information, use coupon on page 157.

# There are important differences in screw conveyors



**UNIFORM PITCH** — Specialized modern machinery assures accurate forming, producing uniformity in flighting curvature.

**ONLY SPECIALLY SELECTED STEELS** are used to meet Link-Belt's rigid specifications — assuring smooth flight surfaces.

**STRAIGHTNESS** is checked before shipping and extra care is taken in handling and loading.

**DRIVES** — Link-Belt builds a complete line of gear and chain drives, couplings, bearings. One proved source, one responsibility.

**TROUGHS** are accurately fabricated to assure better fit of all components. Link-Belt offers a choice of metals to fit your particular application.

**HANGERS** are available in a wide range of styles and mountings with various bearings.

**JIG-DRILLED COUPLING BOLT HOLES** assure complete and easy assembly. Matched fit of shaft and coupling prevents "play."

**DISCHARGE SPOUTS AND GATES** can be fixed or detachable. Flat or curved slide gates can be hand or rack-and-pinion operated.

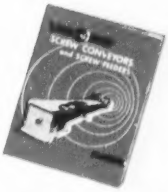
**GATES** are available for bolting or welding in place right on the job to provide versatility in location of trough openings.

## LINK-BELT gives you sound engineering plus accuracy of manufacture for top performance

WHEN you buy a Link-Belt Screw Conveyor, you can be sure of efficient operation plus long-life, low-maintenance service. Link-Belt builds all types and sizes of components—you get the screw conveyor that's *right* for your job . . . with all components *completely integrated*. What's more, long-lasting efficiency is assured, thanks to Link-Belt's unequalled accuracy of manufacture. Let your nearby Link-Belt sales representative or distributor point out the many important differences in screw conveyors. And be sure he gives you a copy of new Book 2289.

13.277

Get this complete screw conveyor book—92 pages of pre-engineered selection and application data. Ask for Book 2289.



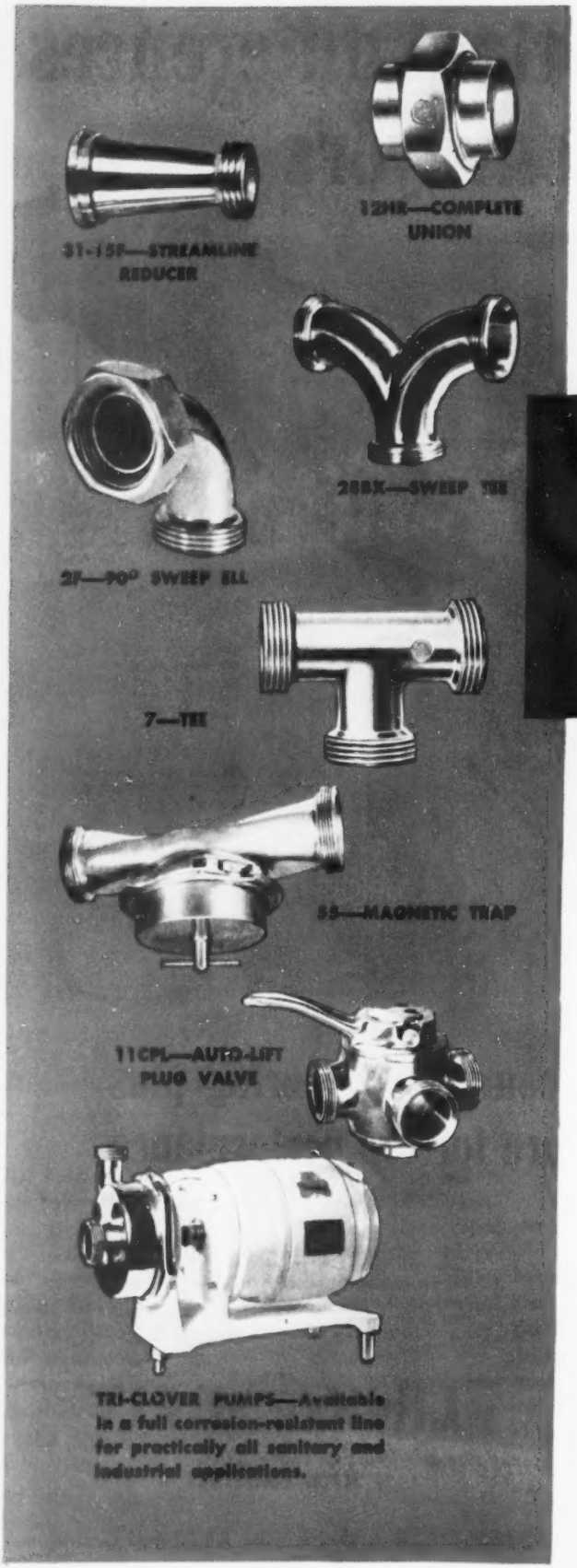
LINK-BELT

SCREW CONVEYORS

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle; Scarboro, Toronto and Elmira, Ont. (Canada); Springs (South Africa); Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities.



For more information, use coupon on page 157.




Try TRI-CLOVER

# QUALITY *Stainless Steel Sanitary Fittings*

## . . . available from STOCK

HERE is an opportunity for you to bring your sanitary liquid conveying lines up to date—with Tri-Clover Stainless Steel Sanitary Fittings.

Available in a complete line of types and sizes, from 1 in. through 4 in., Tri-Clover Sanitary Fittings represent the very highest quality. Precision fabrication methods and workmanship responsible for this quality are both costly and time-consuming . . . but the excellent, long-term service obtained in actual installations prove beyond doubt these methods are well worth while.

Tri-Clover Sanitary Fittings, Valves, Pumps, Tubing and Specialties are available from stocks carried by leading jobbers all over the country.

*See your nearest TRI-CLOVER distributor for further details.*

Tri-Clover®
MACHINE CO.
Kenosha, Wisconsin

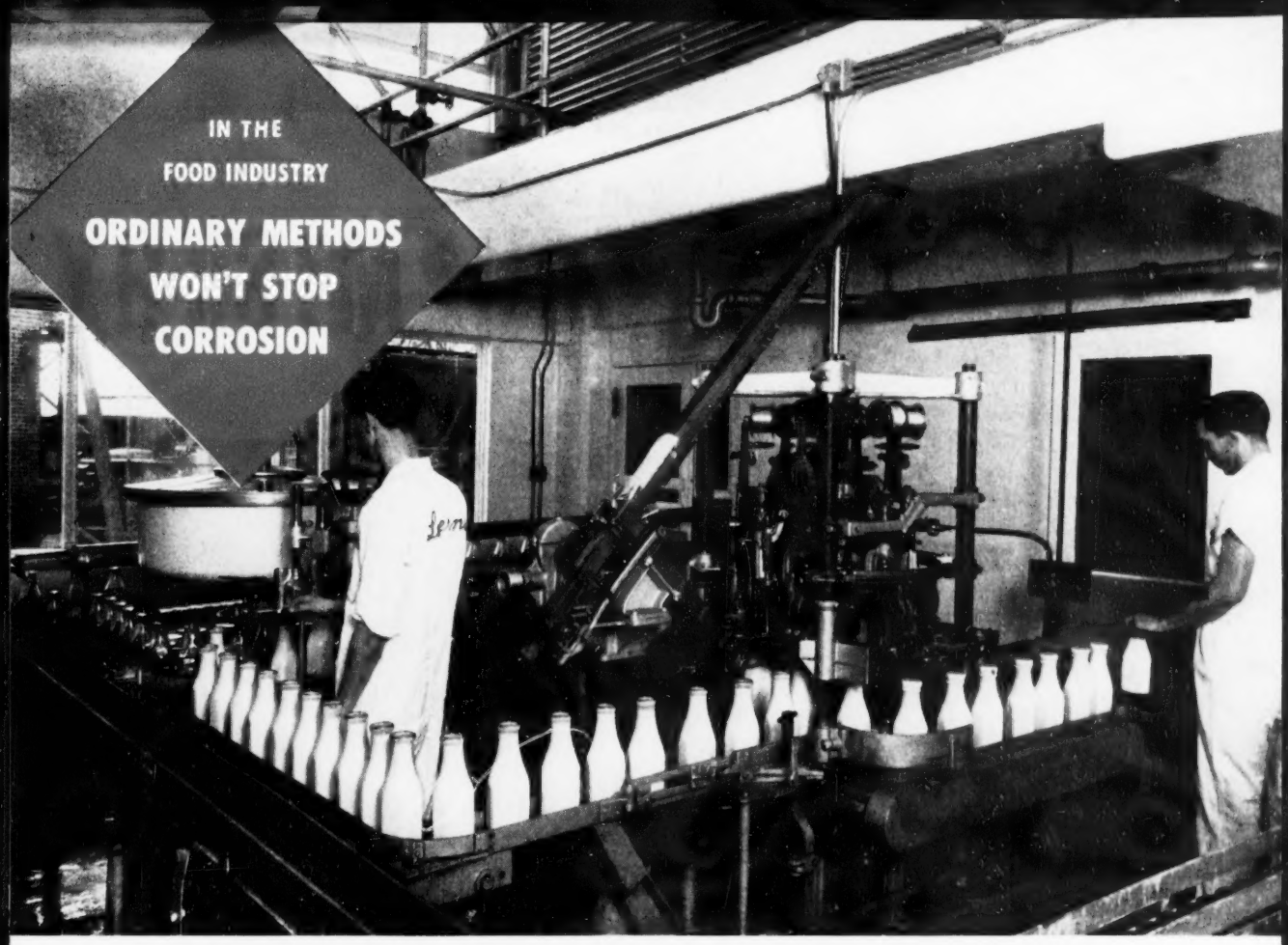
RIALLOY AND STAINLESS STEEL SANITARY FITTINGS, VALVES, PUMPS, TUBING, SPECIALTIES

TRI-CLOVER

FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS

THE Complete LINE

S153




# SPECIFY THE AMERCOAT METHOD— Designed to Give You *PLUS* PROTECTION

Ordinary methods for controlling corrosion usually produce the ordinary results—rapid paint failure, costly replacements, product contamination, excess down-time, and hampered production. Halfway measures and the use of one or two general purpose coatings simply cannot provide adequate protection against corrosion's ceaseless attack.

Amercoat gives you a proven method of corrosion control, assuring you proper protection through these PLUS features:

**1. Careful analysis** by a trained engineer of all the conditions present in each corrosion problem.

**2. The ONE best recommendation** for the particular problem. AMERCOAT is a complete line of coatings, each formulated to solve or control specific corrosion problems.

**3. On-the-job assistance** to your applicators and supervisors by a trained engineer. The AMERCOAT method ensures proper attention to surface preparation and application techniques for maximum protection.

**4. Complete stocks** of fresh materials always near you at one of AMERCOAT's five regional warehouses or more than 20 franchised distributor warehouses throughout the United States.

**5. Service based on experience.** The AMERCOAT method of corrosion control is the result of nearly 20 years' experience in solving or controlling corrosion problems in every major industry throughout the United States.

Write today for the name and address of the AMERCOAT representative in your area. At no obligation, he will gladly help you analyze your corrosion problems and evaluate your present control measures. If it is determined that you have a problem within our scope of experience, he will outline a complete program of AMERCOAT's PLUS protection for your plant or equipment.

Amercoat CORPORATION

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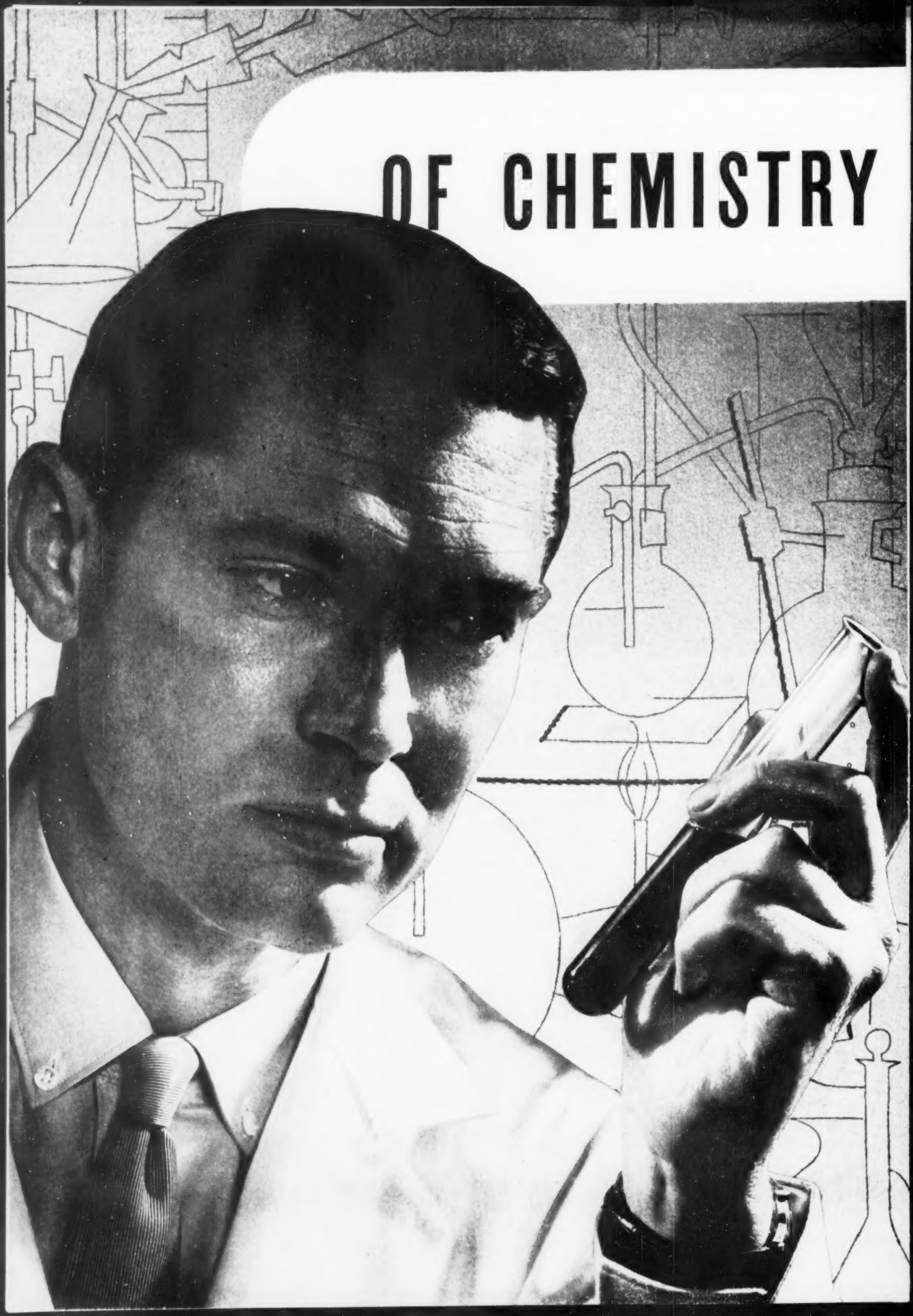
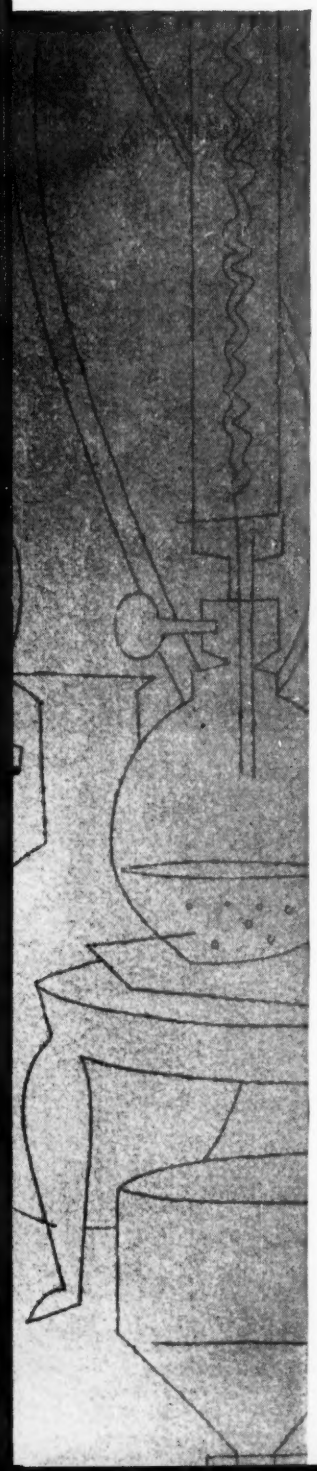
South Gate, Calif.
Chicago, Ill.
Newark, N. J.
Jacksonville, Fla.
Houston, Texas

# OF CHEMISTRY



# AND CASH REGISTERS...



***In Pfizer research laboratories, the language of the cash register . . . in terms of profits for food processors . . . is spoken as fluently as the language of chemistry. That's because Pfizer chemists are constantly searching for better ways to***

1. CUT PROCESSING COSTS IN FOOD PLANTS
2. GIVE ESTABLISHED FOOD PRODUCTS GREATER SALES APPEAL
3. HELP CREATE NEW AND BETTER FOOD PRODUCTS
4. SIMPLIFY HANDLING

***All four have a single aim: greater profits for food processors.***

Take Pfizer **CITRIC ACID ANHYDROUS** for example. As an acidulant for carbonated beverages, sherbets, gelatin desserts, jams and jellies, this Pfizer development enhances natural fruit flavor, giving these foods greater sales appeal. Having no water of crystallization, it has important advantages over hydrous citric acid. It cannot dry out, even after months of storage . . . it does not cake under proper storage conditions nor absorb water from the atmosphere. The absence of water of crystallization makes it possible to prepare stable dry food mixes which otherwise would cake badly in storage. Greater uniformity of acidulation is possible because the composition remains constant. And Pfizer Citric Acid Anhydrous can cut freight costs because there's no water to ship.

**ASCORBIC ACID** . . . Vitamin C . . . is widely used as an antioxidant to retard the development of off-color, off-flavor and rancidity. Packers of frozen fruits and fish have for many years recognized the added sales appeal gained by adding Pfizer Ascorbic to their packs. As an antioxidant, Ascorbic is also favored in preparing beverages and processed foods where oxidative spoilage is a problem. Processors of juices, concentrates and fruit ades, too, will find Pfizer Ascorbic a sales builder when used to standardize the Vitamin C content of their brands.

**VITAMIN $B_{12}$** . . . this newest member of the Vitamin B Complex offers great promise in the field of nutrition. Recent clinical research has indicated that Vitamin $B_{12}$ exerts a growth-promoting effect when given as a dietary supplement to children with growth failure. Both Vitamin $B_{12}$ Oral Grade Solids and $B_{12}$ Crystalline have been found to be equally effective. Since Pfizer Oral Grade Solids is the less expensive form, it will be of especial interest in fortifying foods.

Pfizer maintains a skilled staff of technicians ready to assist you in food processing problems. For technical assistance or additional information on these products write:

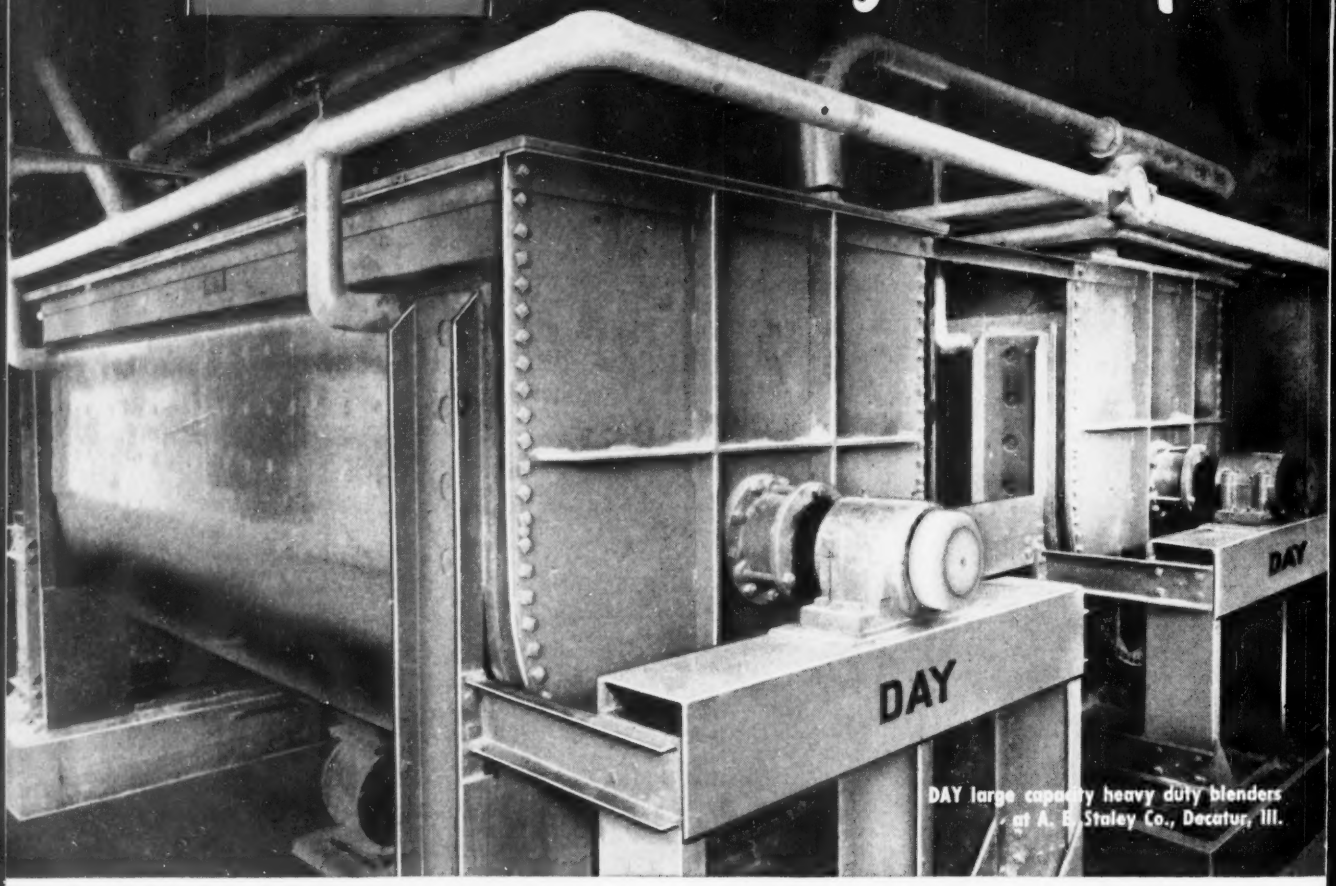
**CHAS. PFIZER & CO., INC.**
630 Flushing Ave., Brooklyn 6, N. Y.
Branch Offices:
Chicago, Ill., San Francisco, Calif., Vernon, Calif., Atlanta, Ga.

*Manufacturing Chemists for Over 100 Years*

Pfizer

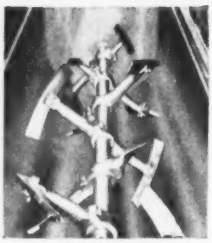
IN BLENDING EQUIPMENT

# DAY means longer life span

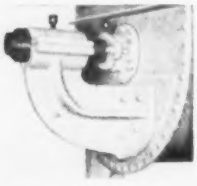



DAY large capacity heavy duty blenders at A. E. Staley Co., Decatur, Ill.

Rugged construction plus precision engineering . . . that's the DAY combination that means *extra* years of trouble-free, economical operation. Plant after plant is finding this true. Whatever your special need, you'll find a DAY Heavy Duty Blender designed for you. Special DAY features on this Heavy Duty Blender have been developed to provide top performance and extra-long equipment life span. The DAY dry color agitator is designed for heavy bodied powders. Other types of agitators are available to meet specific requirements. DAY large outboard bearing construction gives maximum shaft support, smooth operation. Exclusive stuffing box design prevents bearing damage from abrasive materials, and eliminates danger of product contamination by bearing lubricants. The DAY spiral ribbon agitator is designed for paste, semi-paste, granular or liquid products. For complete information or service, call your nearest J. H. Day field engineer or write for Bulletin 354-A.



DRY COLOR AGITATOR



OUTBOARD BEARINGS

SPIRAL RIBBON AGITATOR

FOUNDED 1887

DAY

*when you buy* — *you buy dependability*

**THE J. H. DAY COMPANY**

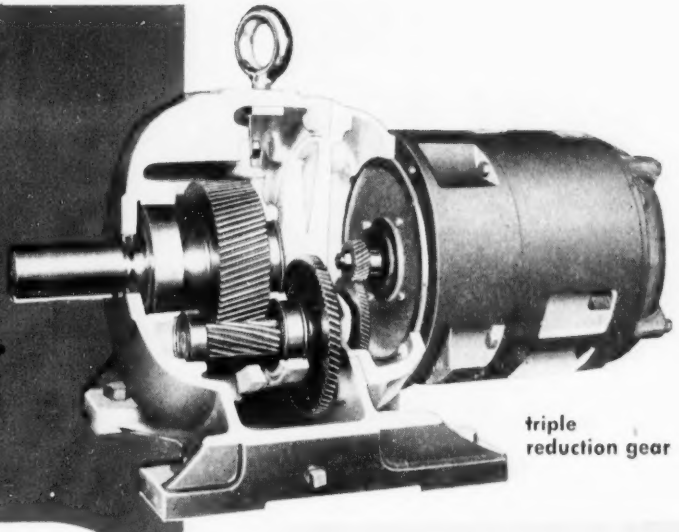
INCORPORATED

1146 HARRISON AVENUE • CINCINNATI 22, OHIO

PRODUCERS OF QUALITY EQUIPMENT FOR BAKING • PAINT & VARNISH • CHEMICAL FOOD • RUBBER • PHARMACEUTICAL • COSMETICS • PAPER & PULP • EXPLOSIVES CERAMICS • CANDY • SOAP • SUGAR • MILK PRODUCTS • OTHER MAJOR INDUSTRIES

# Now...

## Simplify Your Motor Drives... and Save!



triple reduction gear

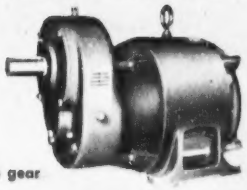
*Here's*

# BUILT-IN SPEED... To Fit Your Need

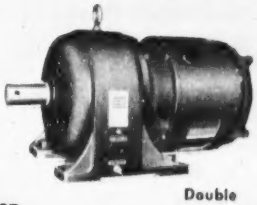
with a complete, new line of

# Century Gearmotors

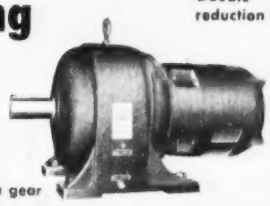
equipped with *Duti-Rated* Precision Gearing



Single reduction gear



Double reduction gear



Triple reduction gear

Now you can profit by the advantages of more compact, safer and simpler motor power transmissions... with rugged Century GEARMOTORS to match the operating speed of your equipment.

This new Century line offers a wider-than-ever choice of:

- **BUILT-IN SPEEDS**
- **MOTOR OPERATING CHARACTERISTICS**
- **FRAME PROTECTION**
- **HORSEPOWER RATINGS**... 1 to 15 h.p. with Duti-Rated Precision Gearing... and fractional gearmotors from ⅛ to ¾ h.p. are also available. Larger ratings can be furnished if required.

Century C MOTORS

**CENTURY ELECTRIC COMPANY**
**1806 Pine Street, St. Louis 3, Mo.**
*Offices and Stockpoints in Principal Cities*

820

**FOR COMPLETE INFORMATION...mail this coupon today:**

**CENTURY ELECTRIC CO.**
**1806 Pine Street, St. Louis 3, Mo.**

Please send Bulletin

☐ Bulletin 4-1p21 ⅛ to ¾ H.P.

☐ Bulletin 4-1p31 1 to 15 H.P.

To:

Name ..... Title .....

Company .....

Address .....

City ..... Zone ..... State .....

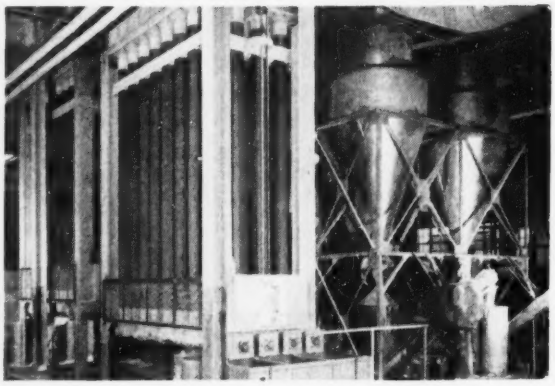


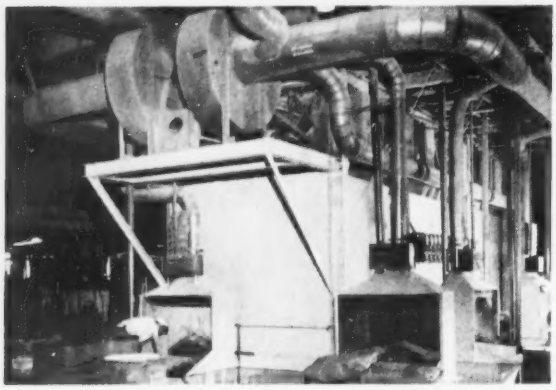
For more information, use coupon on page 157.

# HOW PILLSBURY CONTROLS DUST IN CAKE MIX PLANT . . .

DAY engineers in collaboration with Pillsbury engineers designed, engineered and installed the compact, efficient and economical dust control systems in the Pillsbury cake mix plant at Hamilton, Ohio. Space and head-room were at a premium in this modern, one story plant and as can be seen in the photos the equipment was placed to consume a minimum amount of space.

Two unhoused DAY "AC" (reverse jet, automatic-continuous) Dust Filters (photo right) clean and return to the work space the air from one double DAY Exhauster.



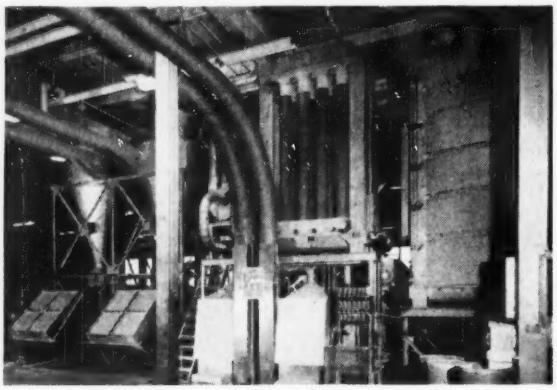


DAY "AC" Filters provide filtering efficiencies up to 99.99+%. The double DAY Exhauster (photo left) controls all of the dust from the bins, dump hoppers, mixers and other points where dust is created.

With DAY "AC" Filters all of the dust control equipment can be kept within the plant. This eliminated the need for placing equipment on the roof, resulting in a neater looking building.

Two DAY Dual-Clone Separators with rotary valves (at right in photo above) are used as primary separators on the DAY Pneumatic Conveying Systems.

A *housed* DAY "AC" Filter (photo at right) is the secondary separator for the pneumatic conveying systems. DAY Pneumatic Conveying Systems provide a self cleaning and flexible method for handling bulk materials. They can be installed where mechanical conveyors won't fit.



**72 YEARS OF EXPERIENCE**

Profit from our long experience handling dust problems for the food industry. The nation's leading millers and food processors depend upon DAY for dust control engineering, equipment and service. A national survey shows DAY the predominant choice by a margin of 10 to 1.

Let DAY solve your dust problem. Our service includes: studying the source of dust, engineering a practical solution, fabricating and installing the complete systems.

DAY SINCE 1881
DUST CONTROL
A SINGLE UNIT OR A COMPLETE SYSTEM

*Bulletin No. 528 contains new information on dust control . . .*
*Write for your copy today.*

**The DAY Company**

817 - 3rd Avenue N.E. • Minneapolis 13, Minnesota
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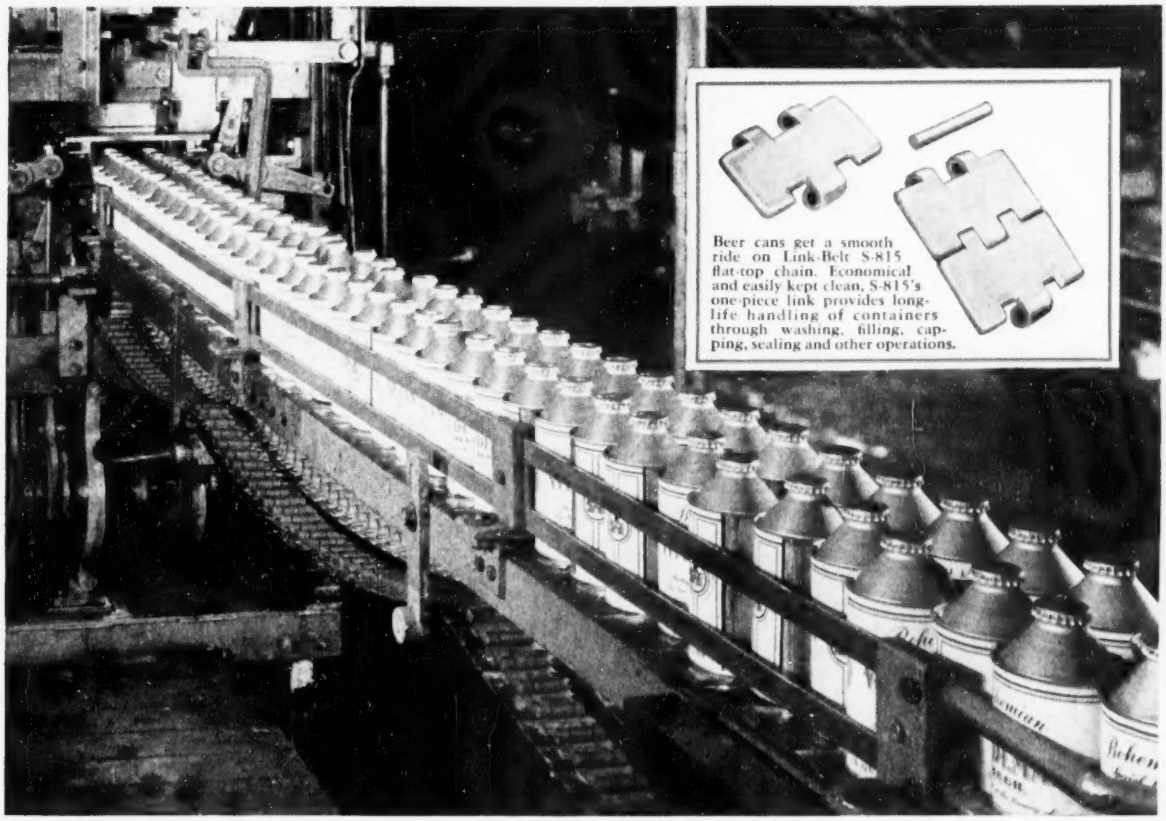
For more information, use coupon on page 157.





Beer cans get a smooth ride on Link-Belt S-815 flat-top chain. Economical and easily kept clean, S-815's one-piece link provides long-life handling of containers through washing, filling, capping, sealing and other operations.

# Here's a smooth-operating, flat-top conveyor chain... moderately priced

## LINK-BELT offers the chain that's best for every job

THE many varied drive and conveying jobs performed by chains and sprockets require different physical characteristics. The S-815 flat-top conveyor chain is an example of how Link-Belt builds a type and size for every purpose.

In addition, every chain in the complete Link-Belt line is built for longer life. Rigid control of raw materials and manufacturing processes is your assurance of uniformity.

For all the facts on S-815 flat-top conveyor chain, ask for Folder 2344. And for information on the complete Link-Belt chain line, see your nearest Link-Belt district sales representative.

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle; Scarboro, Toronto and Elmira, Ont. (Canada); Springs (South Africa); Sydney (Australia). Sales Offices in Principal Cities.

LINK-BELT

CHAINS AND SPROCKETS

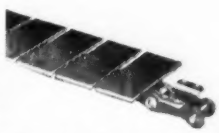
13,325

No one chain serves every purpose . . . get the RIGHT one from Link-Belt's complete line

Class RC crescent flat-top chain—travels in horizontal planes, around corners; ideal for bottles and cans.

Malleable roller chain for conveyors or inclined elevators where reduced chain pull is desired.

Class 400 swivel chain—carries cartons, cases, etc. over paths with both vertical and horizontal turns.



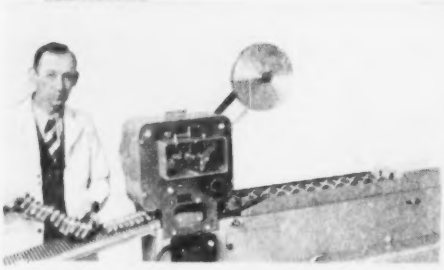
Class RC flat-top chain—precision made for smoothest, spill-free carrying and long life.

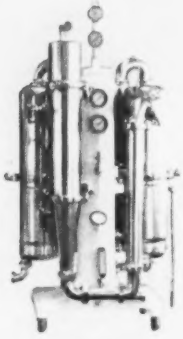
Class RC universal crescent flat-top chain can be used for multiplane operation traveling variety of paths.

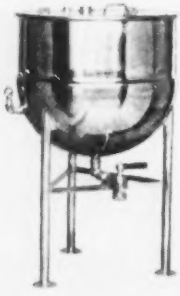


For more information, use coupon on page 157.

# Use This "Trick Done With Mirrors" to Protect Your Products and Your Profits







You may be processing food products . . . or manufacturing the equipment for someone else to do so, but in any case your problems are probably a matter of making a good product at a profit.

And that brings us to the "trick with mirrors". The trick is to always specify Carpenter Stainless Tubing for every requirement. You get the mirrors in the super-smooth I.D. of every length of every shipment. Thus you insure freedom from contamination . . . take a long stride toward a better product.

Your profit protection comes from the fact that Carpenter Stainless Tubing stands up longer even in the toughest service . . . is easier to fabricate . . . is unvarying in adherence to specifications of analysis, dimension and tolerance.

In short, there *is* a difference in Stainless Tubing—and Carpenter makes it. Make the most of this *provable* difference in your own plant. Order your next Stainless Tubing from your Carpenter Distributor. Ask him, too, for any design or engineering aid you may need, when you call Carpenter—"One Call Does It All".

**The Carpenter Steel Company, Alloy Tube Division, Union, N.J.**
Export Dept.: The Carpenter Steel Co., Port Washington, N.Y.
"CARSTEELCO"

*Carpenter*

**STAINLESS TUBING & PIPE**

**- guaranteed on every shipment**



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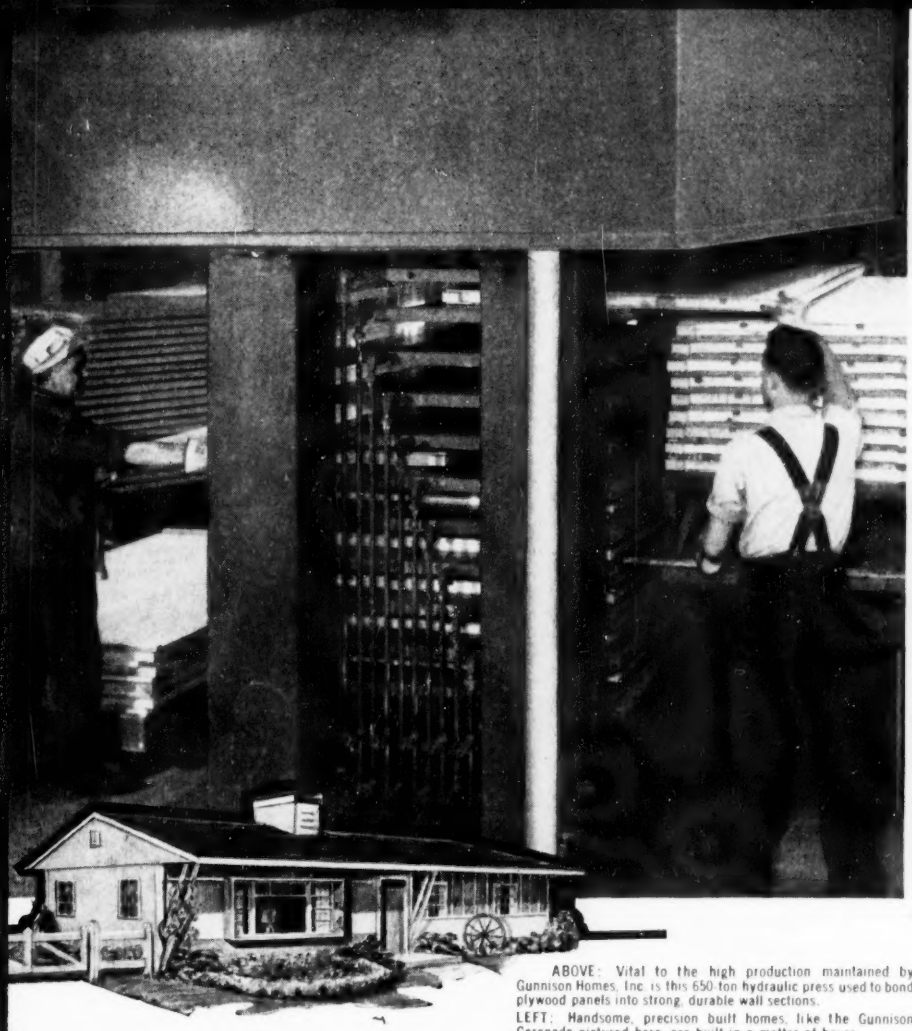


ABOVE: Vital to the high production maintained by Gunnison Homes, Inc. is this 650-ton hydraulic press used to bond plywood panels into strong, durable wall sections.

LEFT: Handsome, precision built homes, like the Gunnison Coronado pictured here, are built in a matter of hours.

## Answers a pressing need for Gunnison Homes, Inc....

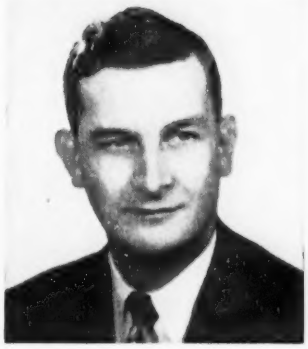
● Gunnison Homes, Inc., situated in New Albany, Indiana, is one of the leaders in the field of manufactured homes. Key to continuous production of precision built homes at the New Albany plant is the 650-ton hydraulic press, shown above, which was installed in 1947. This press processes ten plywood panels every cycle by the combination of heat and pressure . . . a tough job and one requiring reliable hydraulic performance to maintain production schedules.

STANOIL Industrial Oil was installed in the press when it was put into operation six years ago. STANOIL has stood the test of severe operation . . . with no evidence of oil deterioration being found during a recent inspection of the hydraulic system. Operation has been efficient. Minimum make-up oil has been needed to maintain the oil capacity of 450 gallons.

**STANOIL**
TRADE MARK
**Industrial Oil**

Find how STANOIL can benefit you by discussing this multi-purpose oil with a Standard lubrication specialist. You can contact him by phoning your local Standard Oil office. Or, write: Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Ill.

## What's YOUR problem?



**Ralph E. Murnahan**, of Standard Oil's Evansville office, is the lubrication specialist who keeps in constant contact with Gunnison Homes to make certain that there is no interruption of operation due to lubrication difficulties.

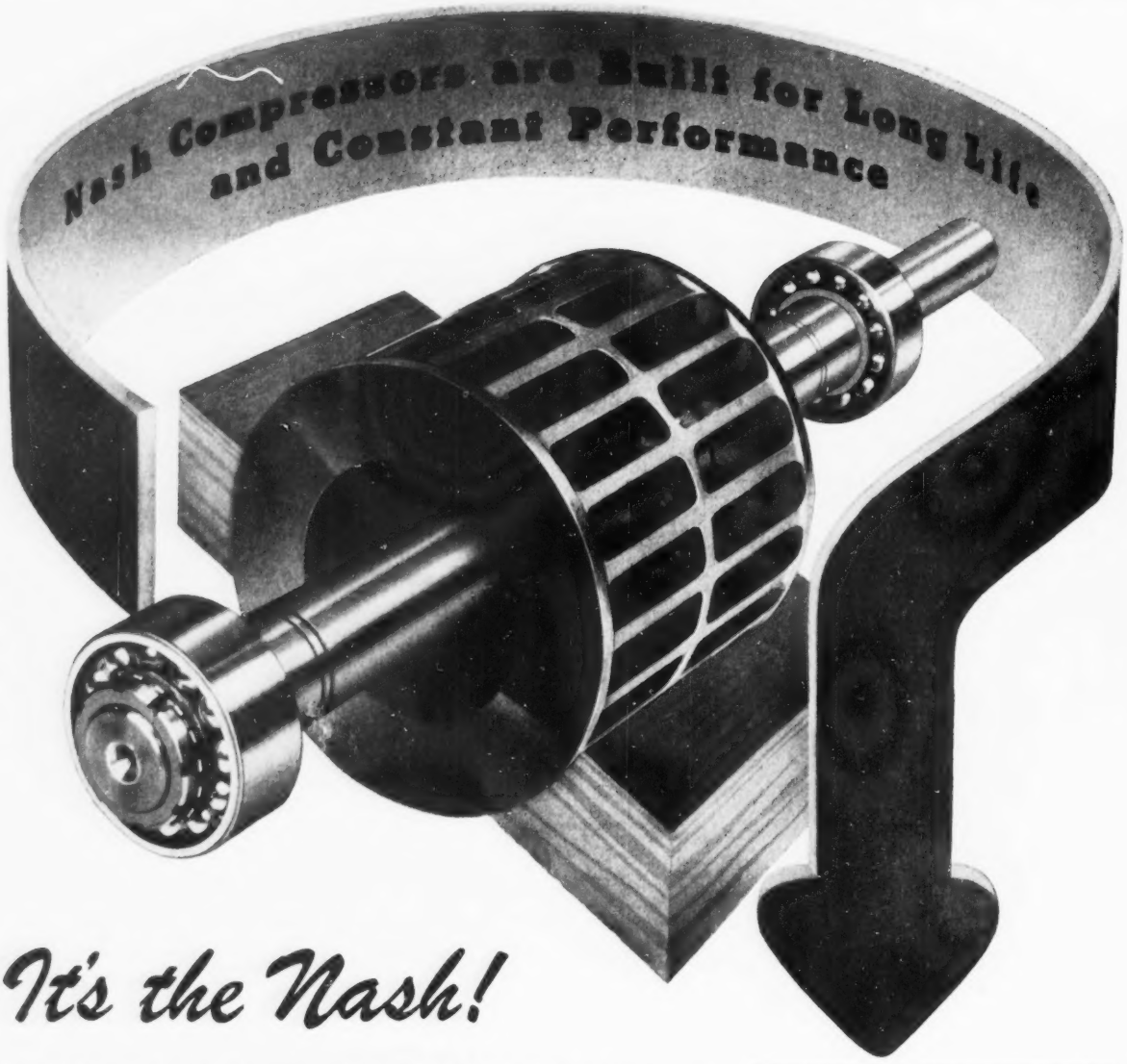
He is one of many lubrication specialists who make their headquarters in Standard's offices throughout the Midwest. These men have been specially trained in Standard's Lubrication Engineering Schools and, in addition, have a wealth of on-the-job experience.

To obtain the service of the lubrication specialist in your area, you need only call your local Standard Oil office. The lubrication specialist will discuss your lubrication problems with you . . . at no obligation to you, of course. He has a complete line of petroleum products to offer you, including:

**SUPERLA Greases**—Available in a wide range of consistency grades and in both lime-soap and soda-soap types. SUPERLA Greases cover a wide range of operations. These efficient products are comparable in quality with the highest type of special greases.

**STANOLITH Greases**—Because these unique lithium soap products possess the heat resistant properties of soda-soap greases and the water resistant properties of lime-soap greases, they offer a solution to lubrication problems caused by the presence of both heat and water.

**STANDARD OIL COMPANY** STANDARD *(Indiana)*




# *It's the Nash!*

The ability of Nash Compressors to maintain original performance over long periods is no accident. Nash Compressors have but a single moving element, the Nash Rotor. This rotor is precision balanced for long bearing life, and it revolves in the pump casing without metallic contact. Internal lubrication, frequent cause of gas contamination, is not employed in a Nash. Yet, these simple pumps maintain 75 lbs. pressure in a single stage, and afford capacities to 6 million cu. ft. per day in a single compact structure.

Nash Compressors have no valves, gears, pistons, sliding vanes or other enemies of long life. Compression is secured by an entirely different principle of operation, which offers important advantages often the answer to gas handling problems difficult with ordinary equipment.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. Because there are no internal wearing parts, maintenance is low. Service is assured by a nation-wide network of Engineering Service offices. Write for bulletins now.

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature Automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

**NASH ENGINEERING COMPANY**

**312 WILSON, SO. NORWALK, CONN.**

*precise manufacturing control every step of the way from basic raw material to intermediates to finished color · Just about all Dyes and Pigments · Uniform pure shades · National strives for the very finest in brightness of shade and high solubility · Remember always*

# National

CERTIFIED

# FOOD COLORS

CERTIFIED COLOR DIVISION

**NATIONAL ANILINE DIVISION**

ALLIED CHEMICAL & DYE CORPORATION

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Boston Philadelphia Chicago Charlotte
San Francisco Portland, Ore. Toronto

Allied Chemical

# what's **corn** doing breaking thru the sound barrier?

**CORN PERFORMS VITAL FUNCTIONS... IN MANY UNEXPECTED PLACES**

The aluminum alloy in the fuselage of a supersonic jet... and the steel-molybdenum in its armor... use a derivative of corn in their manufacture. Specialized corn starches are used in refining and extracting these metals from their ores. This is but one of the numerous examples of how basic research in corn helps American industry... helps you.

**CORN PRODUCTS IN FOOD**

For food manufacturers and processors Corn Products Refining Company supplies highest quality dextrose, regular corn syrup, high conversion corn syrups and a variety of superior starches...recommended ingredients for many processing formulas.

We offer quality in volume supply unexcelled in the field. Complete technical service is available without cost or obligation. If you have a production problem why not check with Corn Products. We welcome your specific technical inquiries.

**CORN PRODUCTS REFINING COMPANY,** 17 Battery Place, New York 4, N. Y.

Manufacturers of
**CERELOSE®**
**brand dextrose**
**PURITOSE®**
**brand corn syrup**
**GLOBE®**
**brand corn syrup**
**BUFFALO®**
**brand corn starch**
**HUDSON RIVER®**
**brand corn starch**

# ADVANCED FERRO-PHOBIA

. . Fer'ro-pho'bia, n. Fear of iron.
It's enough to kill any cost-conscious plant manager—fear of tramp iron damaging equipment, causing shutdowns, ruining product purity.

No couch can cure it, but a Dings Magnet can. When ferro-phobia symptoms — unhappy people moaning about lost production — show up in your plant, phone your representative or write Dings. They'll prepare an effective magnetic Rx, backed by 50 years of experience, that will end the plague in a hurry.

**KEEPING BUTTER SALT PURE**

**Dings induced-roll high-intensity magnetic separators are used by major salt producers to keep there product free of the finest magnetic impurities.**

**Dings**

**DINGS MAGNETIC SEPARATOR COMPANY**
**4741 West Electric Avenue**
**Milwaukee 46, Wisconsin**

DINGS MAGNETIC SEPARATOR COMPANY
4741 West Electric Avenue
Milwaukee 46, Wisconsin

*Please send me Catalog C-1205-B on Dings Perma-Plate Magnets and Catalog C-5000-B with data on the complete Dings line.*

Name_____ Title_____

Firm_____

Address_____

PP483




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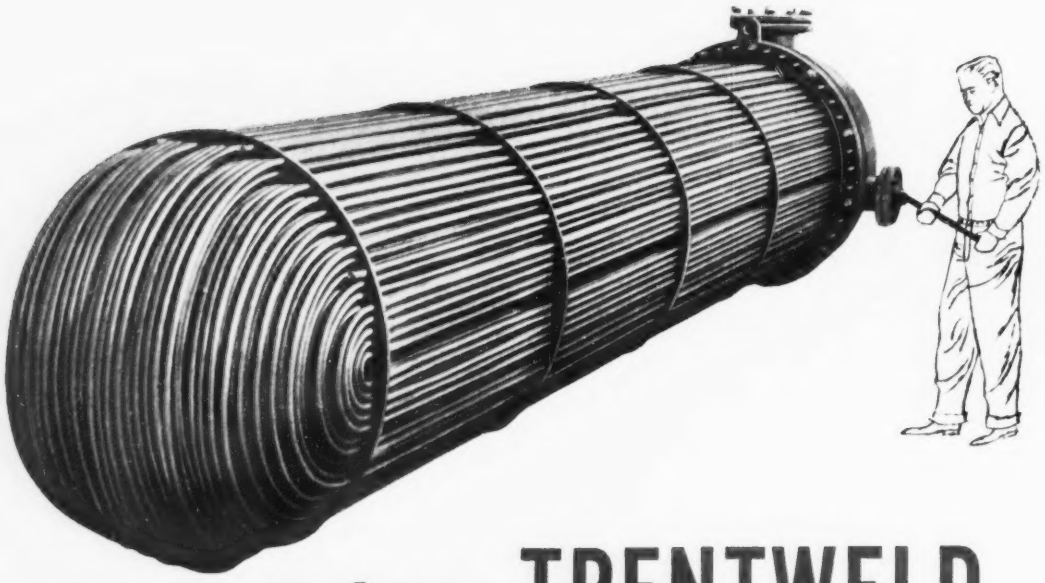
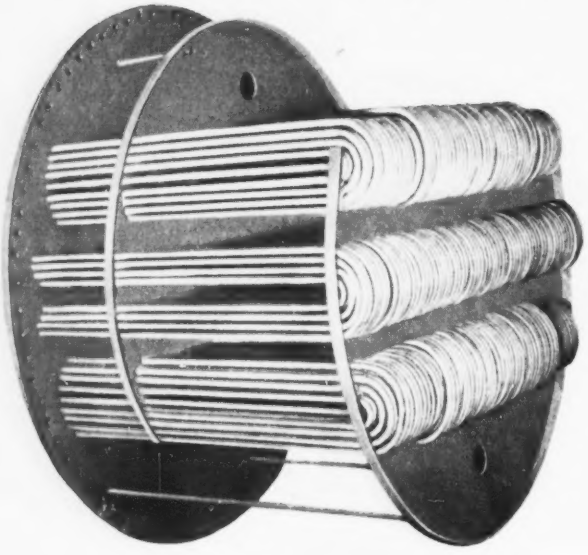


# you can't beat TRENTWELD

## for *your* tubing requirements



*Heat Exchangers built by Vulcan Manufacturing Division, Vulcan Copper & Supply Co., Cincinnati, Ohio.*

Whether it's heat exchangers or milking machines, chemical equipment or fountain pens, or any of a thousand other applications, you just can't buy better tubing than TRENTWELD stainless and high alloy tubing.

One reason is that TRENTWELD stainless *welded* tubing is a product of tube mill specialists . . . worlds apart from job shop fabrication. All of our facilities are devoted solely to the production of top quality tubing.

TRENTWELD is made by an exclusive fusion-welding process in which no filler rod is used. Each piece has an accurate uniformly sound weld that is indistinguishable from the parent metal and just as strong and corrosion-resistant.

TRENTWELD is available in an extremely wide range of sizes from ⅛" to 40" O.D. and up, in most grades, gauges and finishes. Trent engineers are experienced in solving tubing problems in many fields. Write now and let us help with *your* application problem.

**TRENTWELD**

**STAINLESS STEEL TUBING**

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN (Subsidiary of CRUCIBLE STEEL COMPANY OF AMERICA)

*Nature makes it . . .*

*you can preserve it*

# with PFAUDLER vacuum processing!

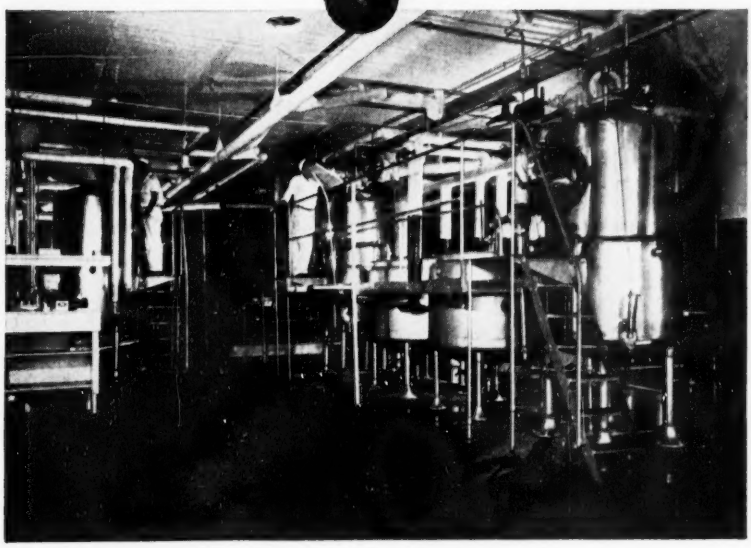
Customers reach for your product again and again if you can give them *natural* purity, color and flavor.

To protect against any loss of these valuable natural qualities, many of the most successful preserving companies process their jellies and preserves in Pfaudler stainless steel vacuum pans.

Pfaudler vacuum processing equipment is easy to operate and keep clean. It provides *accurate* control over the dispersal of fruit in the juice. And it traps the flavor into the preserve by evaporating water at lower than normal boiling temperature. This prevents any change in the *natural* qualities of the product caused by high temperature processing . . . assures a *true* fruit flavor.

If you want a product that will *easily* win customer acceptance, offer the easy-spreading firmness, fresh fruit flavor and appetizing color of a preserve processed in a Pfaudler vacuum system.

To learn more about how *you* can profit by using this system, just mail the handy coupon.



**PFAUDLER VACUUM PROCESSING EQUIPMENT** is easy to keep as spotlessly clean as this installation in one of the nation's largest food processing plants. Built to withstand the pressure of 100% vacuum, Pfaudler vacuum pans are also equipped with a sampler to permit easy withdraw of samples.

**Pfaudler**

THE PFAUDLER CO., ROCHESTER 3, NEW YORK
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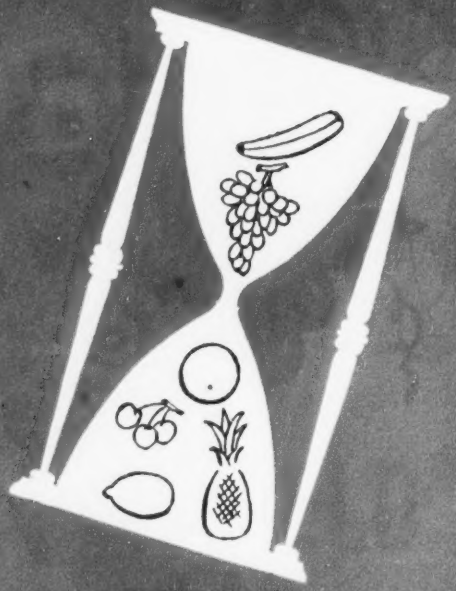
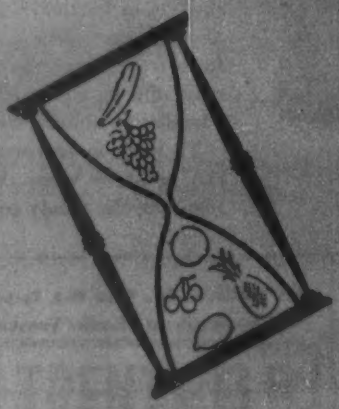
# Sealva

## the NEW



## hermetically sealed FLAVORS

Droplets of fresh, pure, flavor, completely sealed from the atmosphere with an edible protective film . . . SEALVA powdered flavors are not subject to the usual spoiling and oxidation occurring in other flavors when exposed to extended shelf-life. SEALVA flavors have a wide application in all branches of the food industry where lasting strength and quality are desirable. SEALVA flavors are presently available in strawberry, raspberry, cherry, orange, lemon, lime and peppermint. Samples will be forwarded at your request.



VAN AMERINGEN-HAEBLER, INC.

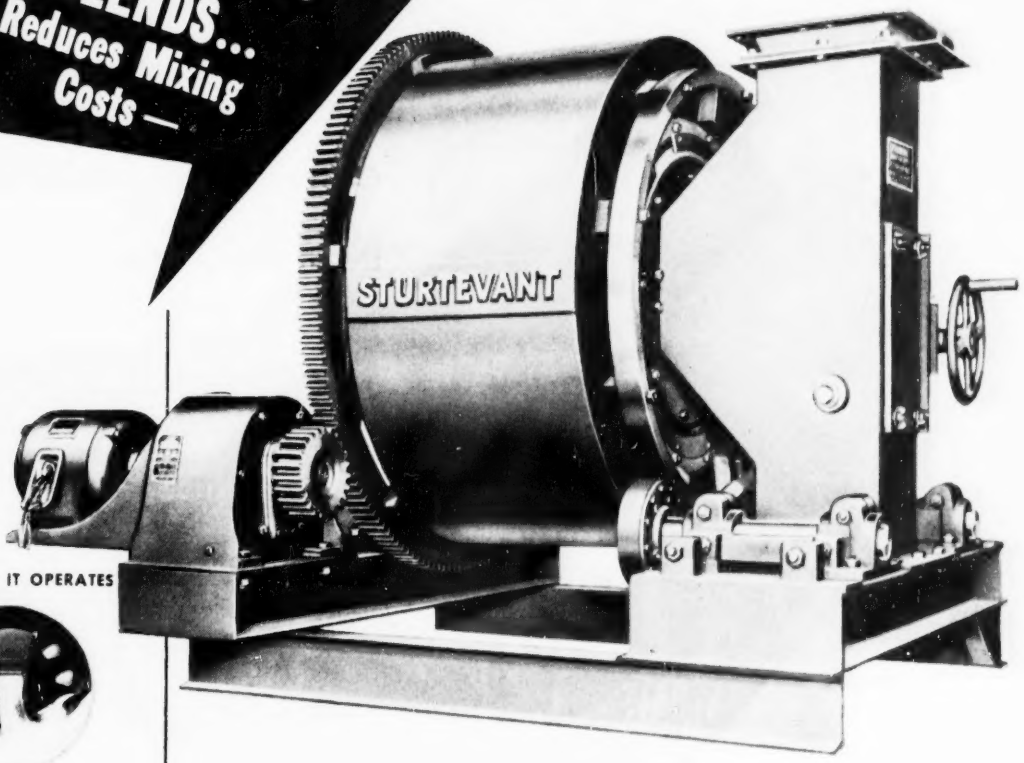
521 WEST 57th STREET, NEW YORK 19, N. Y.

Alva FLAVORS

# 4 WAY MIXING ACTION PRODUCES HOMOGENEOUS BLENDS... Reduces Mixing Costs—

with the

# STURTEVANT BLENDER




HERE'S HOW IT OPERATES

**RECEIVING**

As the materials are received, they are picked up by scoops and cascaded from the top of the machine. At the same time, the revolving drum forces the materials from both ends toward the center of the drum . . . while the swinging chute, which is in mixing position, produces a fourth lateral mixing action.

**DISCHARGING**

By simply throwing a lever, the inlet is closed and the blender is in discharging position. The completely mixed materials drop off the lifting scoops and discharge through chute without segregation of ingredients.

Four separate mixing actions in the Sturtevant Blender assure complete blending of various materials regardless of weights, densities, finenesses, or other physical properties.

This mixing action provides a thoroughly blended product with no substances floating to remain unmixed.

Sturtevant Blenders are available in mixing capacities from 500 to 20,000 pounds. Write for information or engineering assistance.

## STURTEVANT MILL COMPANY

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*Designers and Manufacturers of*

CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS • MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS



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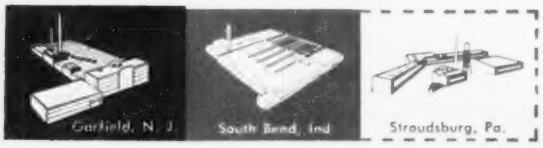
**PRODUCING FINE FOLDING CARTONS FOR LEADERS IN INDUSTRY FOR FIFTY YEARS**

# EMPIRE BOX
## CORPORATION

FINE FOLDING CARTONS SINCE 1903

GARFIELD, N. J., 70 Outwater Lane • CHICAGO, ILL., 17 E. Chestnut St.





For more information, use coupon on page 157.

Electronic spacer patterns guide stockpile through sequence of cuts automatically. Responsive Oilgear Transmission provides speedy travel with pin-point stopping within 3/1000ths of an inch from zero tolerance. Lawson Cutter also used in repetitive single cuts and for trim on sides. Photo in plant of Liedtke Brothers, Chicago.

# The RESULT?

## Accuracy just 900% better
## Production increase 50 to 500%

## Over and over and over again, Oilgear Fluid Power proves to be the right solution to a drive problem. Take the case of the Lawson Cutter.

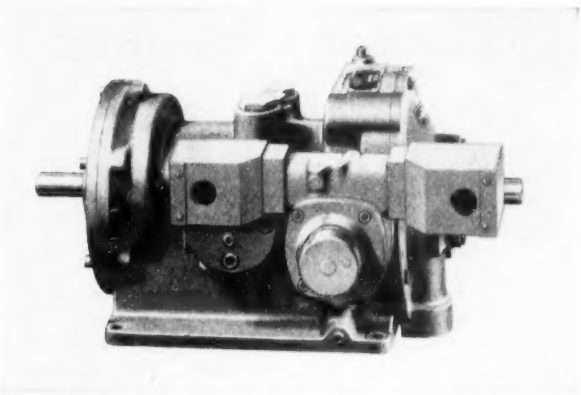
If precision is emphasized anywhere, that "where" is the field of fine color printing of every description. Money, time, effort are spent that art be right, that plates be right, that printing be right—to a hairline. And then comes the cutting operation where all that has gone before is saved—or wasted. Small wonder that cutting remained a hand operation for many years.

But the E. P. Lawson Company, manufacturer of cutting machines, wanted to modernize and mechanize the operation. Its designers turned to an electronic spacer device. This if anything would give precision in marking *where* to cut. But the next problem was to find a power drive capable of *obeying* the orders the electronic signal system was capable of *giving*. Lawson tried one type of drive. It varied all over the map. Lawson tried another type of drive. It was fairly accurate —but did not hold up.

Finally, as so many machine designers have done, Lawson turned to Oilgear. And there, as so many machine designers have done, Lawson found the answer to its problem.

The answer? Undeviating accuracy within 3/1000ths of an inch from zero tolerance—just 900% better than what had been achieved in the past; speed, translating into production increases of 50% to 500% month in and month out. How? Through the absolute responsiveness of Oilgear Fluid Power Drive to the automatic control system. Immediate, shockless acceleration to full speed "forward". Precise measured slowdown as the feed fence nears the target. Precision stopping "on target" for the cut and then rapid acceleration toward the next cut.

Here again is an example of the superlative "rightness" of Oilgear Fluid Power "generators," motors, transmissions—for almost any type of installation or machine requirement, big, little, and all those in between.



Oilgear Two way Variable Speed Transmission as used on Lawson Electronic Spacer Cutters. These drives also provide unlimited speed range from zero to maximum. Speed changes made in split second or specified time.

Chances are Oilgear is *the* solution you've been looking for. And Oilgear engineers will be just as quick to tell you if Oilgear is *not* for you. Ask for further information from an Oilgear Engineering Representative. No charge. No obligation. THE OILGEAR COMPANY, 1580 W. Pierce St., Milwaukee 4, Wisconsin.

OILGEAR

# OILGEAR

# Allegheny Stainless from Ryerson

# Helps Make Your Milky Way

First rule at the vast Mars candy kitchens in Chicago is *cleanliness*. That's why gleaming, corrosion-resistant stainless steel is used abundantly in the making and handling of famous Mars confections. And prompt, personal service on Allegheny Stainless is provided by the nearby Ryerson Plant.

You'll find Ryerson a convenient source for stainless too, because Ryerson stainless stocks are the largest in the nation. If you want a straight chrome type, we have the widest selection. If you use chrome-nickel stainless, Ryerson is still your best source.

Ten types of stainless sheets are on hand. Pipe and tubing—more than 260 miles of it. Also stainless fittings and fastenings, bars, plates, etc. In aircraft quality stainless alone we carry more than 300 different items. And our stainless specialists are always ready to work with you on problems of application or fabrication.

You'll find beautiful Allegheny Stainless Steel easy to clean, easy to keep clean. It's the time-tested product of America's oldest stainless producer. So, call Ryerson—pioneer warehouse distributor of stainless—for all your requirements and count on us for fast service.

**PRINCIPAL PRODUCTS**

**CARBON STEEL BARS**—Hot rolled and cold finished
**STRUCTURALS**—Channels, angles, beams, etc.
**PLATES**—Many types including Inland 4-Way Safety Plate
**SHEETS**—Hot and cold rolled, many types and coatings
**TUBING**—Seamless and welded, mechanical and boiler tubes
**ALLOYS**—Hot rolled, cold finished, heat treated. Also tool steel
**STAINLESS**—Allegheny bars, plates, sheets, tubes, etc.
**BABBITT**—Five types, also Ryertex plastic bearings
**MACHINERY & TOOLS**—For metal fabrication

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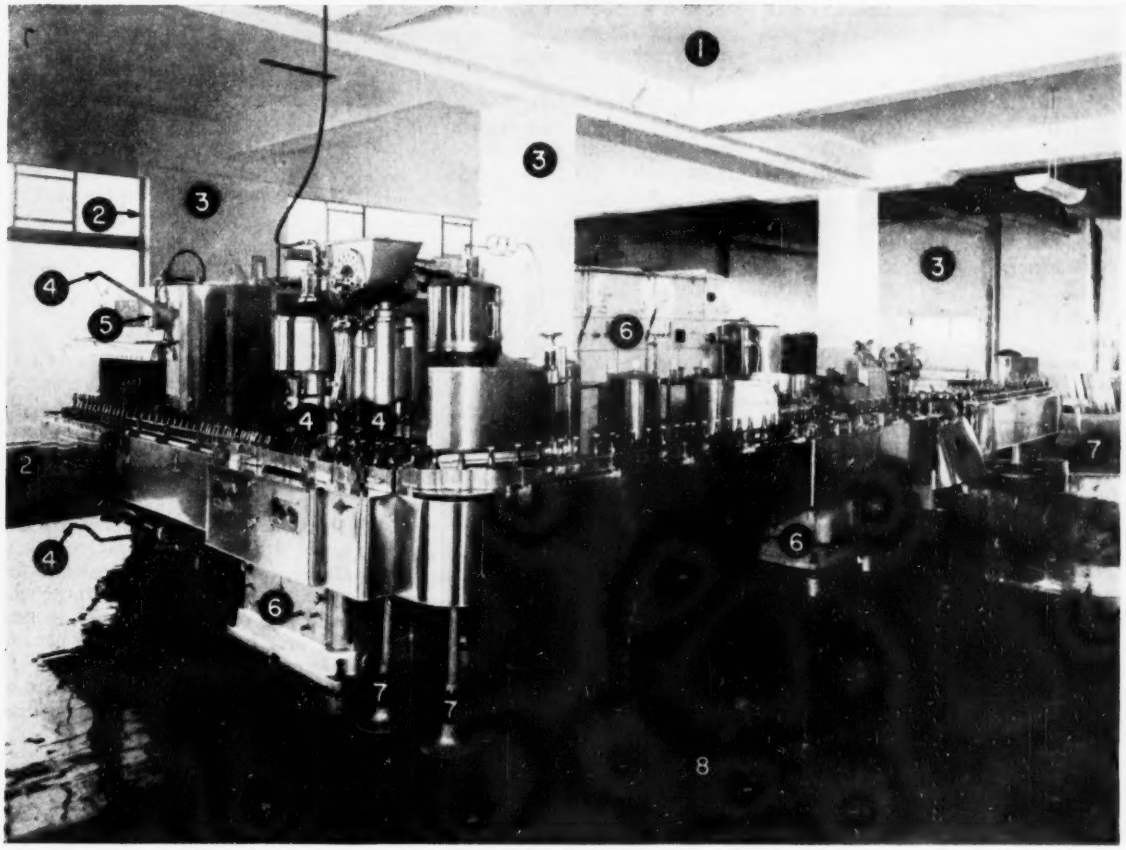



**PUT TO WORK** in the plant, functional color scheme quickly promotes improved performance. This keyed photo shows "how" of application, with light-reflectant values given in percentages. (1) ceiling, white; (2) window frame and dado, green, 25 percent; (3) walls, green, 55; (4) hazardous moving parts, levers, orange; (5) switch box, blue; (6) painted equipment, medium gray, 40; (7) "strike-against" hazards, yellow; (8) floor, gray, 25.

## *Benefits High With*

# Engineered Plant Colors

Proper selection and use of colors in the food plant bring increased output, easier maintenance, improved employee morale, and greater safety

**FABER BIRREN**
President, Faber Birren & Co., New York City

The food processing industry is most profoundly affected by color.

Every plant—brewery, bakery, cannery, dairy, meat, or whatever—can benefit through functional coloring, proper use of which has a vital relation to the making of better food products at lower costs.

People prefer colors rather than grays or blacks. And regardless of race, nationality, or creed, they prefer certain colors to others. Blue, red, and green are most popular, while violet, orange, and yellow are less appealing to the average person. A knowledge of color principles can be utilized to solve numerous problems in the food industry. Functional use of color has proven its practicality beyond all doubt.

Color plays a part in the selection of vegetables at their place of growth. It also promotes efficiency in their processing. And finally, at the point of sale, its proper use in packaging can win or lose the battle for the consumer's dollar.

Functional color practice in food processing plants naturally divides into four advantageous uses in practical plant operation:

► **It promotes (1) increased worker production, (2) easier maintenance, (3)**

improved employee morale, and (4) greater safety.

Plant efficiency being of prime importance, it may quickly be noted that dingy or dirty surroundings depress employees, lower morale. Poorly lighted areas in which important tasks must be performed lead to eyestrain, tension, and fatigue. Acknowledging these facts, industrial management has frequently set about brightening up the facilities and plant atmosphere by an excessive use of white—symbol of spotless cleanliness—or other light colors. But here the fact is overlooked that visibility is directly related to color differences.

### Avoiding Glare

Too much brightness will cause glare. Brilliant color can be distracting. It tends to draw the worker's eyes away from his task and otherwise annoy and disturb him.

**Proper use of color: (1) Makes seeing easier, (2) smooths out unfavorable contrasts, (3) minimizes eye adjustments, and (4) draws attention to tasks and hazards.**

Visual efficiency depends on the right brightness as well as color. The ratio of light reflectant values of any two surfaces in a room is known as "brightness ratio." Thus, if a huge cooking vat reflects 5 percent of the light which strikes it and the gleaming surface of an inspection table reflects 85 percent, the brightness ratio is expressed as 5 to 85 or 1 to 17. Scientific tests have confirmed that where brightness ratios are within 1 to 5, or 1 to 10 at most, the human eye can see for long periods without strain.

Proper use of the principles makes possible the development of a wide variety of color schemes, each with specific plant suitabilities. And extended experience in hundreds of industrial plants has developed a set of scientific rules to assure ease of seeing.

For instance, ceiling should be white or an offshade for adequate light, with a reflectance factor of approximately 80 to 85 percent. Side walls should be in colors, with a light reflectance value of 50 to 60 percent. In plants where there is a large window expanse, white is frequently used on upper walls and narrow areas between windows, leaving the dado as the only part of the wall to which color is added. Floors should if practical, have a light reflectance of around 30 percent.

Best colors for equipment and machinery are those providing a reflectance of about 30 percent. Local needs, the color of the food product being processed, packaged, or manufactured, and the general type of operation involved may also govern the color scheme for definite areas.

In plants where workers are engaged in difficult tasks and all are stationed facing in the same direction, the end-wall may be colored in a pleasing tint having a reflectance of 25 to 40 percent. Thus, a worker who glances up is offered relaxation rather than the stimulation of glare. This also tends to lessen the strain of prolonged convergence of vision on critical tasks, and so prove restful.

### Hot or Cold

Color magically creates temperature effects, too. Science definitely recognizes "warm" colors and "cold" colors. Scarlet or yellow, for instance, create a definite feeling of warmth. Blues and greens used in industrial plant interiors are generally cool and refreshing, especially to workers subjected to the relatively high temperatures to be found in many processing plants. Refrigerated rooms can be made psychologically warmer through the use of colors like peach, beige, buff, and ivory, while warmness of areas can be offset to some degree through the use of blues, blue-greens, and greens.

Let us cite specific examples of color use: One packing plant's meat cutting room, having a relatively low temperature, was made to seem many degrees warmer through the proper use of a peach color.

It also was noted, in another plant, that the inspection and grading of tomatoes was amazingly improved and made easier through use of a bluish green in that area.

Painting of equipment and machinery, particularly parts that form a background for the work, is generally approved, since it provides a contrast for the work being performed. In a canning plant, for instance, color should be only slightly darker or lighter than the product being processed.

Thus, at one cannery, visibility was vastly improved when some equipment was painted in a lighter tone and a light-colored shield placed behind the work. Operators of the equipment reported almost immediate relief from eye-strain.

Such shields back of work tend to (1) blank-off space behind the work, (2) provide contrast with materials behind the point of operation, (3) reflect more light at critical points, and (4) hold operator's eyes to a uniform adjustment.

### Improved Morale

Efficiency of production and employee morale are closely linked. Happy, contented employees turn out more and better work than those who are depressed or discouraged. In general, brightness stimulates the nervous system, hence is appropriate for all areas in which muscular activity is called for, whatever the product being processed or manufactured.

While definite benefits directly traceable to color are not easy to pin down, a survey conducted by the U. S. Public Health Service demonstrated that better light and color resulted in a 5.5 percent increase in the productivity of workers. This represented an annual increased output of $139.25 per worker. Thus, in a plant with 100 employees a similar increase in productivity would up gross output $13,925, and a plant with 1,000 workers would increase the gross $139,250.

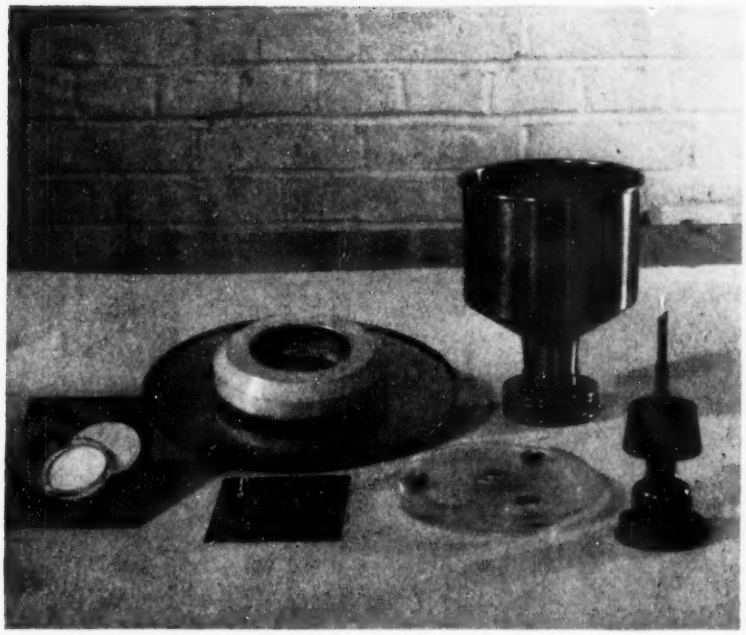
Bright, cheerful colors for worker uniforms also tend to improve employee morale. While pure-white uniforms are frequently the rule in food production, other carefully chosen

(*Turn to page 188*)

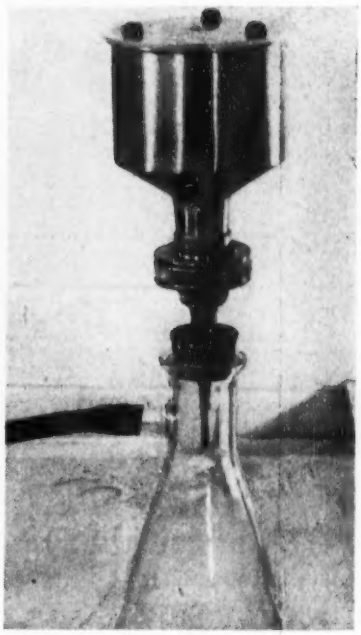
## Colors for Food-Plant Components—And the Reasons for Them

**(Percentages Indicate Reflection)**

| Walls | Dado and Trim | Equipment | Comments |
|---|---|---|---|
| Light blue-green 55% | Medium blue-green 25% | Medium gray 40% | Psychologically cool effect for average tasks, any exposure |
| Peach 65% | Terra cotta 40% | Medium gray 40% | North exposure, low temperature or poor light |
| Light gray 50% | Medium gray 40% | Medium blue 40% | For difficult seeing tasks. Cool effect avoids distraction and glare |
| Pale yellow 65% | Medium gray 40% | Medium green 25% | For physical and muscular tasks and wide areas where walls are distant |



**FILTER** membrane is a small, paper-thin disk of known porosity (left). Also shown are components of filter unit and standard petri dish.



**ASSEMBLED** filter is mounted on flask attached to vacuum source.

# New Bacteria Spotter

—quickly targets air and water microorganisms undetectable by standard procedures. Bacteria are separated by millipore filter. Method applicable to dairy plant control and other food processes

**CARROLL P. BURKE**

National Dairy Research Laboratories, Inc., Oakdale, New York

One of the latest methods now being evaluated for enumerating bacteria is the molecular or millipore filter technique. This is primarily a method for concentrating small numbers of bacteria.

With it they may be removed from aqueous solutions and gaseous substances and grown directly on the filter itself.* And, although only one application has been investigated extensively, studies now under way indicate these possibilities:

1. *Enumeration of psychrophilic bacteria in dairy products.*

2. *Germicidal tests where 100 percent destruction of test organisms is desired.*

3. *Checking air contamination by use of aerosol type filter. (Air may also be sterilized by passage through the millipore filter.)*

4. *Bacteriological examination of milk and beverage bottles, ice cream containers, glassware, etc.*

5. *Sterilization of buffers where heat treatment is undesirable.*

6. *Routine checks on water supplies.*

7. *Bacteriological control of food products, especially liquids where numbers of bacteria are low.*

*Procedures described are largely those developed by Drs. Alexander Goetz and N. Tsuneishi, California Institute of Technology.

## Description of Equipment

The filter membrane is a small, circular (2 in. dia.) paper-thin disk containing about 500 million pore openings. This membrane will filter out and collect on its surfaces all the bacteria present in any liquid which is drawn (usually with the aid of suction) through it.

After the bacteria have been collected, the membrane is aseptically removed from the filter mount and placed on an absorbent pad to which has been added a small amount of double-strength nutrient broth containing an indicator that aids in identification of the colonies.

Membrane and pad are incubated in a humid atmosphere at a suitable temperature. Within 4-8 hr., colonies develop that can be observed with a low magnification microscope. A 12-hr. incubation period usually results in colonies readily seen with the naked eye.

Membranes may be sterilized by autoclaving at 15 psi. for 15 min. if they are packed with absorbent pads between each filter disk and the disks and pads wrapped in kraft paper. They can also be sterilized by exposure to ethylene oxide.

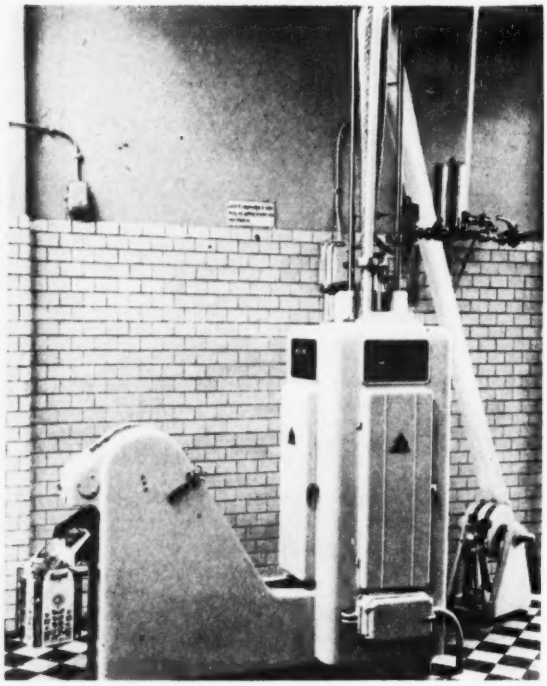
Filter mount, which consists of any suitable funnel arrangement capable of supporting the membrane under vacuum, can also be sterilized by autoclaving or by exposure to vapors resulting from burning of methyl alcohol.

## Preliminary Tests

When the new filter technique became available for general use, its primary application was in detection of microorganisms present in water and air, and currently it is used most ex-

(Turn to page 178)

**NOVEL PACKAGE** is completely sealed. Housewife opens it by cutting off or punching hole in any corner.



**FORMING-FILLING** machine requires only 3 x 11 ft. floor space, is simple to operate, takes little labor.

# Pyramid-Type Paper Bottles Made, Filled Link-Fashion

**★ Take less paper . . . ★ Less labor . . . ★ Less floor and storage space**

Milk container formed from roll of plastic-coated paper and filled in one continuous operation. Applicable to other products

**FE STAFF**

A new type paper container made in tetrahedron form is now being used by a number of dairies in Sweden for distribution of milk and coffee cream.

Called Tetra Pak because of its shape, the container is formed from a paper web, filled and automatically packed into special fiber delivery cases in one continuous operation.

**Although developed primarily for dairy products, the package is applicable to any liquid or semi-liquid.**

Following its use for more than two years, these savings are apparent:

1. *Paper*—approximately 65 percent less is required than for other paper milk bottles.
2. *Labor*—75 percent less since machine requires attention of only one operator to produce 5,400 filled packages per hour.
3. *Storage space*—paper for the bottles comes in 40-lb. rolls that require a minimum of space; filled packages nest tightly in delivery cases which, in turn, need little space in cold room or on trucks.

Containers are formed from bleached kraft paper printed on one side and plastic coated on the other.

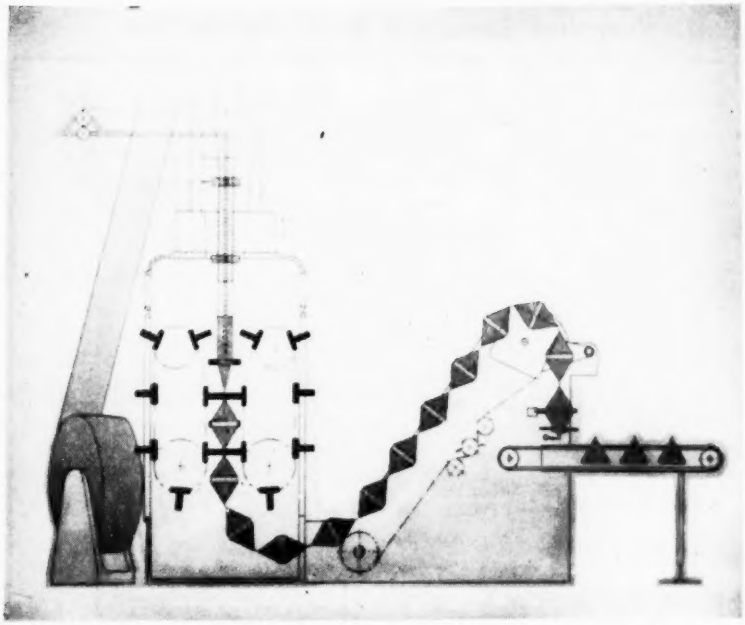
This plastic film, which is on the inside of the finished package serves two important purposes: It makes the container moisture-proof, and it permits heat-sealing wherever necessary to enable continuous production of the packages.

To produce the container, paper is fed from a roll into the top of the forming-filling machine. As it moves downward, the sheet of paper is formed into a tube and the long seam heat sealed.

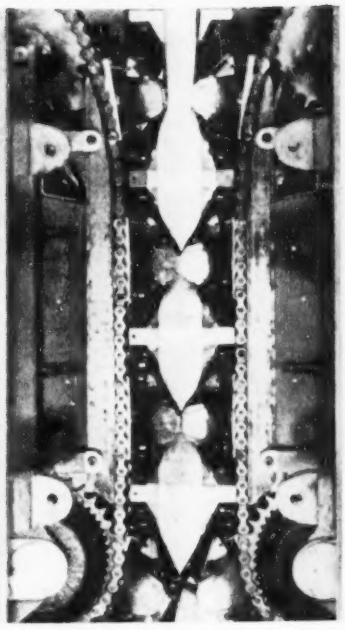
Then a pair of jaws, containing irons heated to 350 deg. F., move together and seal the tube at desired locations. These sealing jaws, mounted on endless chains, move downward at the same speed as the tube.

Filling proceeds simultaneously with container forming. This is accomplished by a stainless steel supply pipe that extends down into the paper tube.

Level of liquid is maintained just above the point where the seal is formed. In this way complete filling is assured. Foaming is prevented by extending supply pipe below level of liquid.



**HOW** machine operates. Paper from roll (left) is formed into tube that is filled with milk. Then heatsealing jaws (solid black T's) press tube together, sealing it into uniform size packages. Linked packages go to cutting unit (right), where they are separated, then cartoned.



**CLOSEUP** of forming-sealing. Heat-sealing irons, mounted on endless chains, move downward at same speed as paper tube, apply 1-ton pressure.

Diameter of tube-forming die and distance between heat-sealing jaws determines quantity of liquid in package. These sizes are pre-set at the factory and cannot be varied. Thus, a different unit is required for each size bottle filled.

A perfect seal is assured by application of approximately 1 ton pressure on the jaws. This pressure also forces all liquid out of the area to be sealed.

Filled containers leave the machine in a continuous ribbon and go to the cutting unit. Here they are cut apart and automatically packed into special 6-sided cases, which they completely fill.

Small size 1/5 pt. tetra containers for coffee cream are packed in square boxes or handle bags.

Today, two size machines are made—for 1 pt. and 1/5 pt. However, additional sizes—½ qt., ½ pt., and jiggers—are to be made available in the near future. The jigger is especially designed for restaurant and airline individual servings of coffee cream.

Machine takes up a space 3x11 ft. exclusive of that required for the paper feed roll and packaging. It is installed on a lease basis.

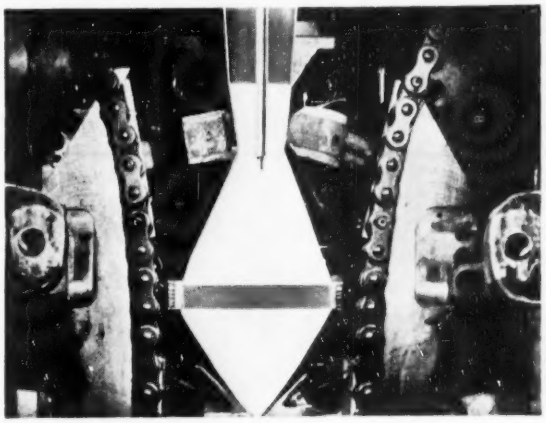
Filling machine is comprised of a cast shell on which are mounted the tube-forming die and filling mechanism, four side units with heat-sealing jaws and their endless chain assemblies, and a 2 hp. motor. Entire unit is easily and quickly disassembled for cleaning.

Rolls of paper are delivered printed and coated with type and weight of plastic suited to product being packaged. During the coating process, the paper is sterilized. As an additional precaution, however, provision is made for further sterilization during forming of the tube in the fillers.

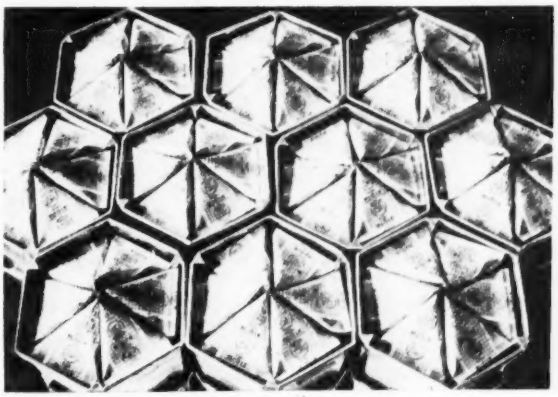
Shape of the package—a regular 3-sided pyramid—provides it with a number of bases. No matter how it happens to stand it's always right end up.

And there is no pouring lip problem. The user just cuts, or tears, off a corner of the container, then after pouring folds it over to close.

Maker of the new machine is AB Tetra Pak, Lund, Sweden.

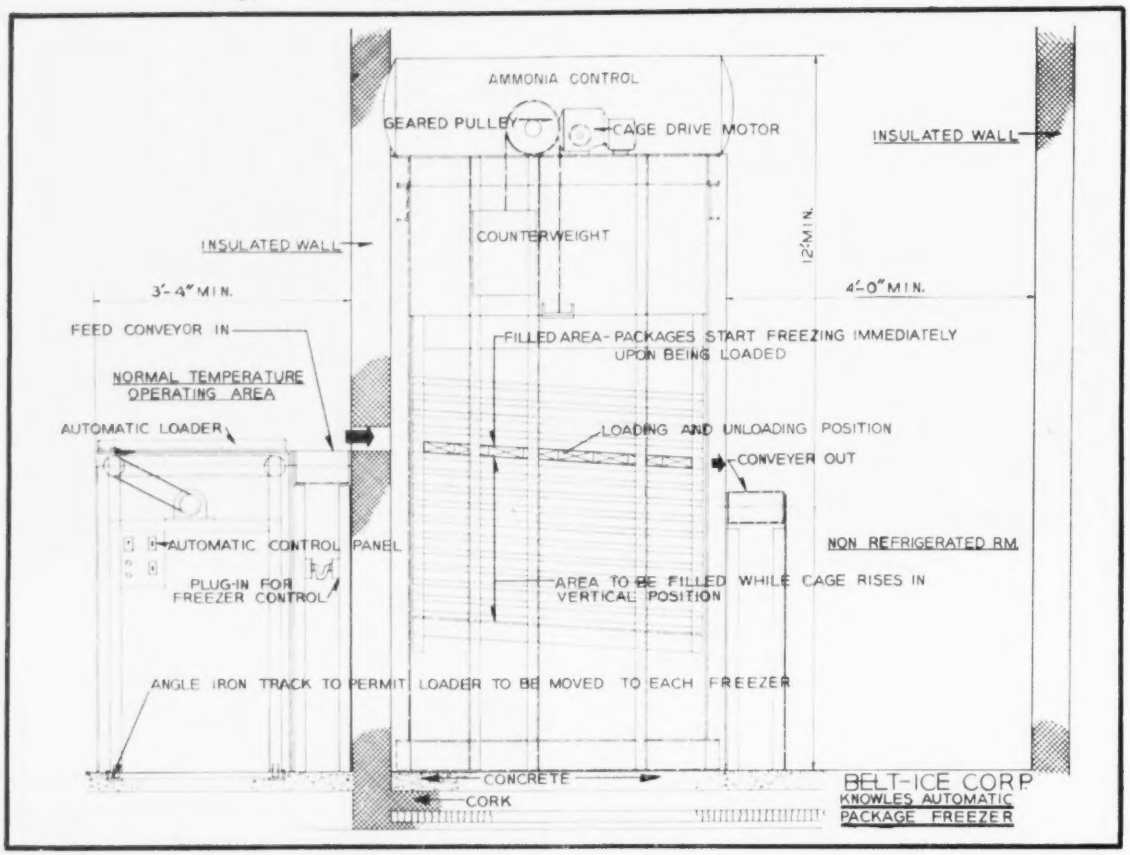


**CUTAWAY** shows how milk enters paper tube via stainless pipe, which reaches below surface to prevent foaming.



**FILLED** containers are packed in six-sided fiber cases that save space in cold room.

**Loading, Freezing, Discharging Revealed by Cross-Section**




## *How Western Processors*

# Slash Package-Freezing Costs

They "non-stop" their cartons through new automatic unit with less labor and power . . . Old trucking and traying abolished . . . Electric eyes control action

**FE STAFF**

Food freezing costs are markedly reduced by the new automatic, continuous package freezer that has been developed by President F. W. Knowles of Belt Ice Corp., Seattle.

Two of these units have been operating on an experimental basis for the past two years at Evergreen Frozen Foods Co., Snohomish, Wash. And the evaluation indicates that the new unit reduces labor costs up to 75 percent, compared to the requirements in the operation of truck-and-tunnel or manually loaded plate freezers.

In addition, this Knowles Automatic Package Freezer effects savings in power costs, also eliminates some equipment used in the truck-and-tunnel type operations.

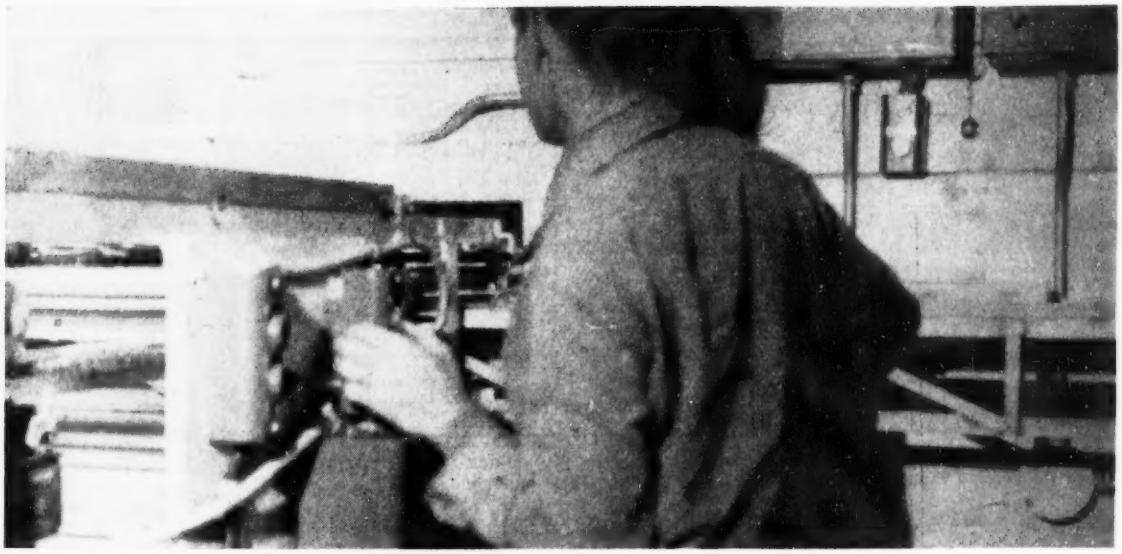
The versatile unit is made in three models for varying capacities. By minor adjustments, they can be arranged to freeze packages of any size or thickness. It is installed in a non-refrigerated but insulated room and requires a space of approximately 6x8 ft. and a height of 12 ft. The package feed mechanism is located outside of this room, permitting the operator to work in normal instead of frigid temperature, upping efficiency.

Capacity of the freezer varies with the size of package being frozen. One small unit will freeze 1,000 packages (10-oz. size) per hour. A single unit requires about 15 tons of refrigeration to operate at capacity.

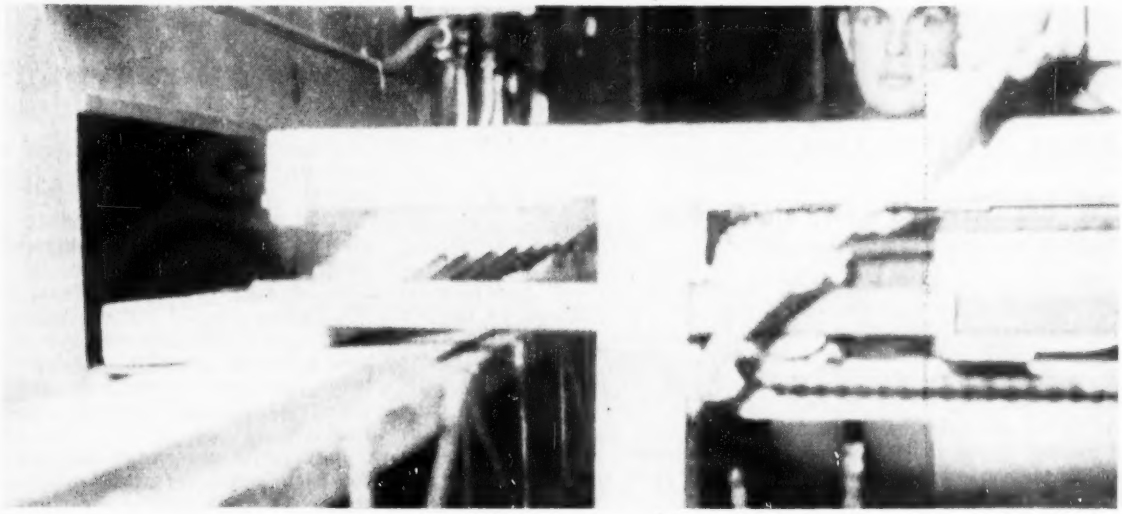
When completely charged, there are 2,160 10½-oz., or 1,440 4x5-in. packages, residing in the Evergreen unit. A battery of six small units has a rated freezing capacity of 6,000 cartons (10-oz. size), approximately 1½ tons an hour minimum.

The battery of five larger units installed at Hershey Packing Co., Snohomish, has two automatic loaders that are moved into position on a track to load each freezer. Filled, wrapped cartons are belt-conveyed from the labeler to the loader. By simply pushing a button, the loading

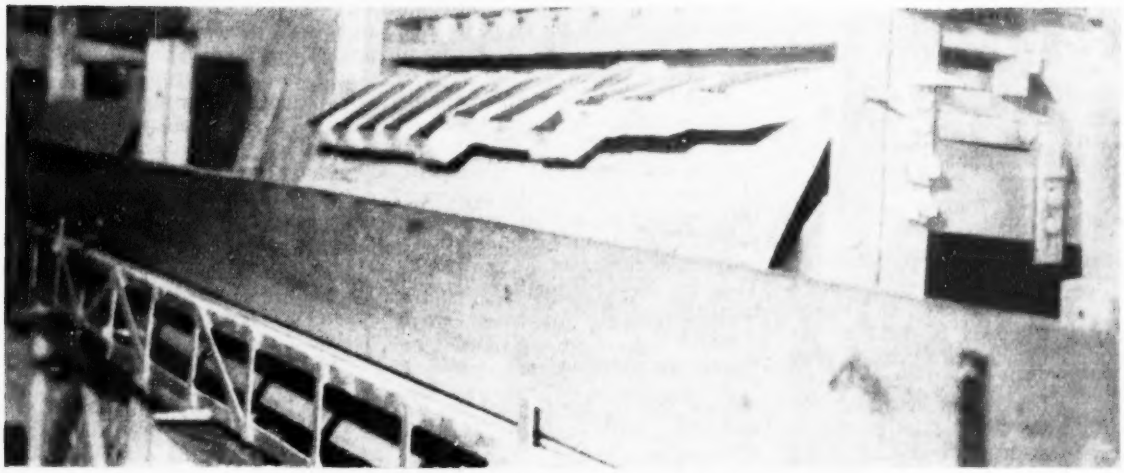
(*Turn to page 180*)



Robot-loader. It gathers 12 cartons, then motor-driven ram . . .

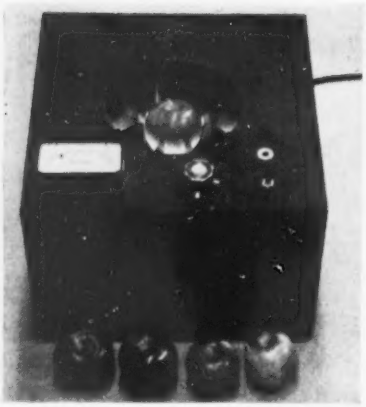


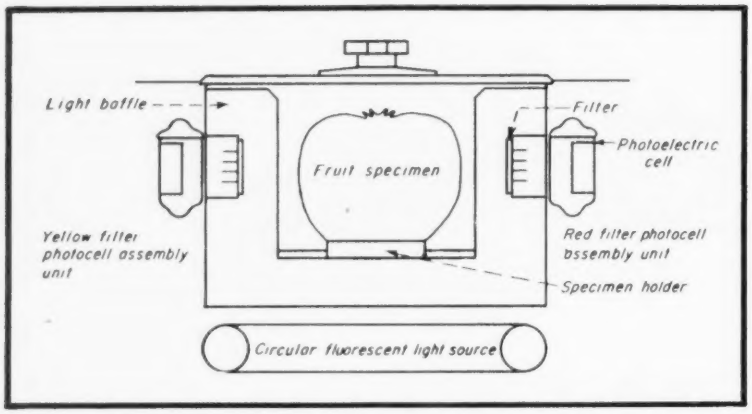
. . . shoves them into freezer via feed conveyor . . .



. . . as lot of frozen-12 drops onto discharge conveyor

**Filtering is red-yellow here . . .**






**PURDUE INSTRUMENT:** Fruit specimen is seen in position for gaging color. Uniform light intensity is obtained with circular fluorescent lamp. Sketch shows relative positions of component parts.

# COLOR GRADING

## Fast, Simple Instruments

## APPLES IN INDIANA

**N. W. DEROSIER and F. W. BILLERBECK**

Purdue Agricultural Experiment Station, Lafayette, Ind.

With the new model Purdue Color Ratio Meter in action, apples are now being color-evaluated in Indiana with exceptional speed and accuracy.

Basic changes in the electronic instrument have included an improvement in its sensitivity by increasing the number of red and yellow filter-photocell units from three to five. In accordance, the scale has been revised. And all components have been placed in one chassis.

Fundamentally, the circuits of this instrument (Model 360-A) are the same as in the initial model (detailed FE May '52, p. 92), except for the ramifications entailed in adding photocells. Using the new scale, reading from 0 to 100, apples having a high red color gage at higher values.

### Varieties Tested

Fruit of the Winesap, McIntosh, Delicious, Starking Delicious, Turley, and Striped Rome (Gallia Beauty) varieties, harvested in 1952 at the Purdue Experimental Orchard, West Lafayette, Ind., were obtained for studies. The apples displayed the various color distributions commonly associated with these varieties. Being thus representative of fruit encountered in conventional grading work, this selection promised to indicate any weaknesses as well as the values to be expected in application of the instrument for practical grading.

The apples were randomly numbered. Each was then evaluated by the improved meter and data recorded. Next, apples were placed on a table, where they were properly illuminated to facilitate visual grading. And then a panel of 18 observers, including men expert in the field of pomology, graded the apples. Approximately 50 samples for each variety were evaluated.

All determinations were according to the percentage of typical good red color on each specimen. This meant that the intensity of the red and area of surface covered by the red were both included in the final value. Each panel member recorded the values he gave the specimens an a special form. These human-vision results were then tabulated.

### Human vs. Machine

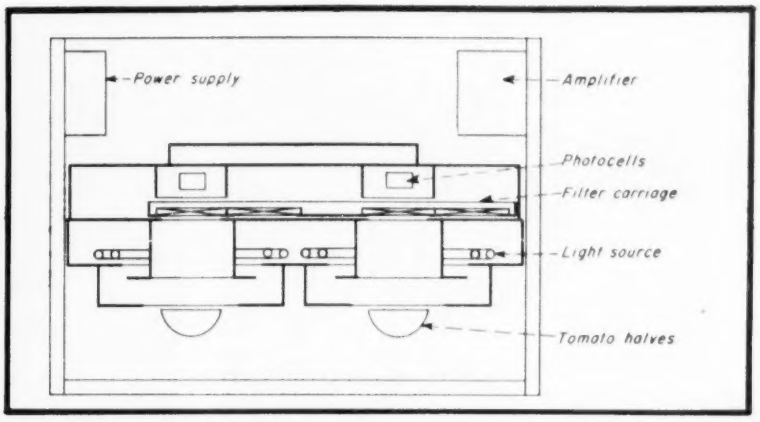
Then the average panel value for each apple was calculated. Through statistical procedures, these averages and the meter's values were next used in determining the correlation coefficients and also for plotting varietal graphs.

Following are the correlation coefficients found for each varietal group: Winesap, .89; McIntosh, .90; Delicious, .81; Starking Delicious, .97; Turley, .89; and Striped Rome, .92. These values indicated that a good degree of correlation existed between the visual observations and those made by the instrument electronically.

A graph for each variety was now constructed using the panel's average color score for the apples and corresponding values given by the instrument. From this data, regression lines were calculated and plotted to represent the average relations between percent good red color visually assigned and the meter values on the various apples. Then, by means of a panel, the values for the properly standardized instrument were correlated to percent food red color visually determined, and in turn to color requirements of the U.S. grades for the varieties.

In the original PCRM, the sampling area was limited because of the fewer filter-photocells. Also, the first unit comprised two individual chassis —viewing and measuring—which were rather awkward to transport. Further, the scale was graduated from 0 to 200 and on this instrument, the higher the red color of the specimen, the lower the value of the reading.

. . . red-green here




**AGTRON UNIT:** Tomatoes, placed under position indicators, as shown, are judged by halves. Low pressure neon and mercury vapor lamps illuminate specimens. Diagram reveals working parts.

# BY ELECTRONICS

## Eliminate Human Errors

## TOMATOES IN CALIFORNIA

**T. J. SMITH**
Magnuson Engineers, San Jose, Calif.

Now designated for official use in California is the new Agtron grading unit that quickly and exactly determines color of tomatoes. Portable and sturdily built, it is designed for rugged use under any weather conditions.

The instrument was developed to completely eliminate the human element in color-quality evaluation.

Sample tomatoes are cut in half, as required by California law, and initially rated visually as to color. When the color grade is not immediately apparent to the eye, inspectors then use the new instrument designed and manufactured by Magnuson Engineers, San Jose, Calif.

The state of California, which produces about one-half of the country's tomato crop, has purchased 150 of the electronically operated color devices for use during this year's tomato canning season.

In the development of the instrument, the three primary objectives were: To eliminate the many variables encountered in visual color inspection, to get direct readings, and to incorporate simplicity, thus permitting use by non-technical personnel.

When grading tomatoes, an individual's judgment is affected by such things as surface gloss, color variations over the cut surface, location of light sources, and other tomatoes in his view. Other factors are the person's physical condition and the color sensitivity of his eyes.

California inspectors are carefully trained in color grading and their work periods are adjusted to avoid eye fatigue. Furthermore, they are often shifted among various grading stations to make for utmost uniformity in the state-wide grading.

Yet with all these precautions, the State Bureau of Fruit & Vegetable Standardization felt that improvements in procedure were necessary because of the vital importance attached to deciding the value of tomato loads. Under state law, a load rejected by an inspector cannot be canned, and is usually discarded.

### How It Works

When using the Agtron, the inspector places the two tomato halves in spring-supported cradles (see photo) and moves these into position under phototubes. These tubes view the tomato halves first through red and then green Corning filters. Low-pressure neon and mercury vapor lamps illuminate the product. The glass filters isolate the 640 millimicron line of neon and 546 millimicron line of mercury. By comparing the reflectance of the two lines, the ripeness of the tomato may be determined.

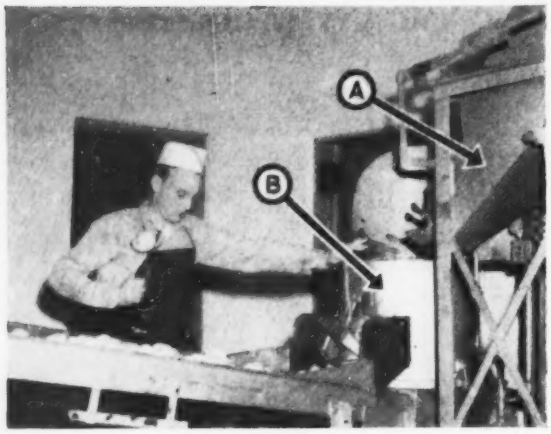
To adjust the mechanism for tomato variations, the filter changer is placed in the red position and the scale reading is set with the "standardize" control to a selected place on the meter. Then the changer is moved to the green position and the scale indicates the tomato grade.

The meter scale is divided into bands indicating "Well Colored", "Fairly Well Colored", and "Below Color". These bands were determined by comparing instrument readings with the grading of experienced inspectors.

At the request of Maj. W. S. Everts of the Canners League of California, Magnuson began work on an improved method of color measurement in 1949. The unit has now been finally perfected after intensive study and development work. The University of California and Huggins Laboratories, Menlo Park, Calif., assisted on the technical problems involved.

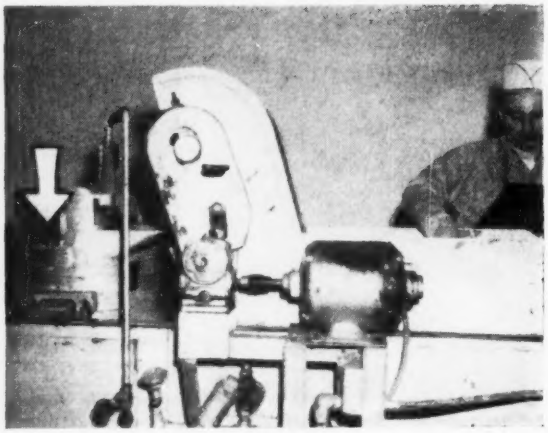
During the canning season of 1951, three of the new instruments were sent to grading stations in the state. When vibration, temperature changes, variations in supply voltage, and other factors, were found to have an adverse effect on the device, alterations were made by the manufacturer. During the 1952 season 20 of the modified instruments were in operation. As stated earlier, 150 will be delivered to the State this year.

## Takes Only 15 Min. From Spuds . . .



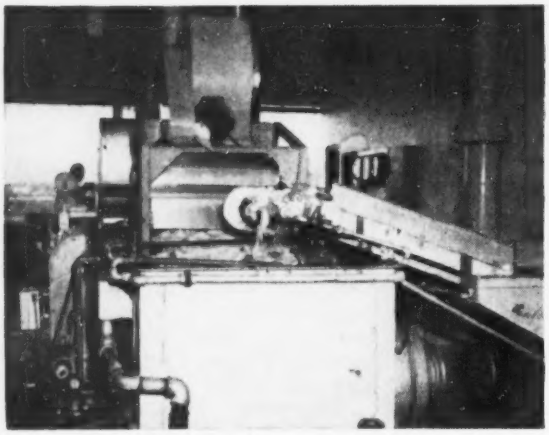

**1—Peeling**

Spuds are fed in 70-lb. batches from hopper (A) to be whirled in abrasive peeler (B). Large ones are halved.



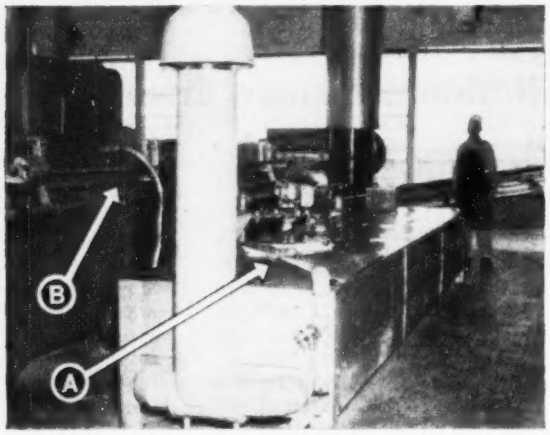
**2—Slicing**

1,500 slices per minute is speed of this rotary 3-bladed cutter (arrow). Knives are sharp to cut uniform slices.



**3—De-starching**

Slices are soaked and washed to remove excess starch. Then they are given showers of clean water and drained.




**4—Circulating**

Blend of vegetable oils is circulated from 3,000-lb. capacity supply tank (A) to fryer (B).

## *They Bet—And Won With*

# Quality Chips

**JOHN V. ZIEMBA**
Associate Editor, "Food Engineering"

When John E. Cain Co. started making potato chips 25 years ago, production amounted to a mere 250 lb. a day.

No wonder. For in those days only wood-burning iron pots were available. And the processing task was limited by slow hand peeling, slicing, and packaging.

**▶ What a difference today! Daily output has now soared above the 5,000-lb. mark in this firm's new scientifically designed plant in Medford, Mass. Here, time from burlap sack to cellophane pack is only 15 min. And production runs 7,200 packages hourly.**

Keying this notable engineering progress have been advances in equipment and processes, which have been geared to the phenomenal growth of this branch of the food industry—an annual user of 25,000,000 bu. of potatoes and 60,000 tons of vegetable oils.

Small wonder these improvements enabled Cain's to skyrocket its output 20 times during the past quarter century and to turn out better and more uniform quality chips.

### Plant Is a Beauty

We shall point out specific examples of improved processes engineered along Cain's spanking-new continuous chip line. But first, let's note the attractive building itself.

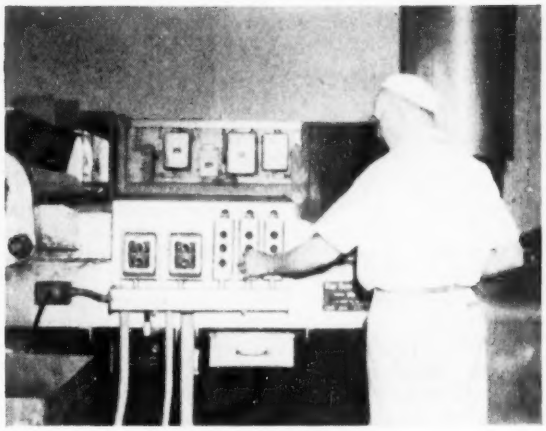
The new single-story plant comprises 20,000 sq. ft. of floor space on 110,000 sq. ft. of land. It is of red Roman and buff brick with modern aluminum sash throughout. High picture windows along the front provide better lighting inside and attract plant visits by the passing public.

Atop the building is one of the

## . . . To Potato Chips

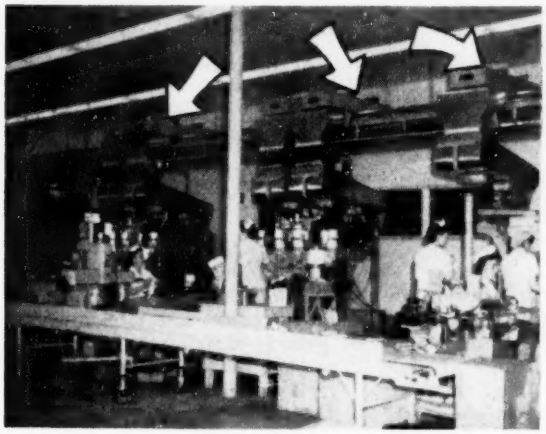
**5—Frying**

Chips take about 6 min. traveling through continuous fryer. Later they continue on to automatic salter.



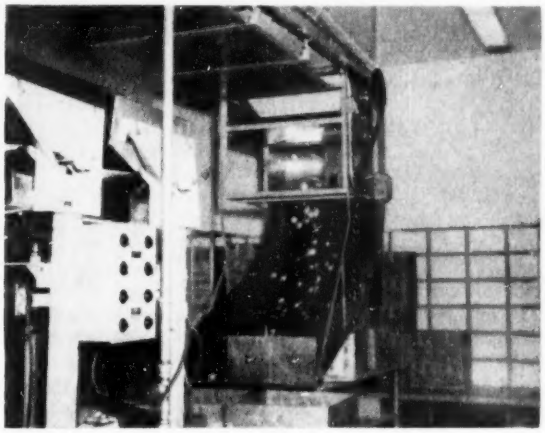
**6—Controlling**

Pressing buttons at control station, operator coordinates performance of units through special motor drives.



**7—Bagging**

Horizontal conveyor and chain-driven paddles (arrows) deliver chips to chutes feeding weighing-filling units.



**8—Packing**

Stainless steel overflow chute gently discharges excess potato chips into 3-lb. capacity bulk cartons.

largest neon signs in New England that flashes the name "CAIN'S" in 15-ft. letters and "POTATO CHIPS" in 10-ft. letters.

Reception-room floor is of colored quarry tile imported from Wales. The back wall is of redwood, while the ceiling is constructed of the latest translucent corrugated plastic material for better diffusion of light.

In the cooking and packaging departments, lights are recessed and glass-covered for sanitary reasons. Ceilings are of rock asbestos for greater cleanliness. Dressing rooms and showers are of ceramic tile.

Shipping, receiving, and parking facilities are at the sides and rear of the beautifully landscaped building. And a 7-car railroad siding is behind the plant.

Potatoes are purchased on the basis of variety and specific gravity—both good measures of chip quality.

Good varieties, for example, include Sebago, Rural New Yorker, Russet Rural, Canus, Chippewa, and Kennebec. Heavy potatoes (those with high specific gravity) makes the best chips. As spuds mature, they become heavier, the specific gravity running highest when the starch content is at a peak. Thus, starch content is a gage of quality in potato chips.

Yield of potato chips per 100-lb. sack is greater with heavier potatoes. Generally, it is around 25 lb. per sack, but varies between 20 and 30 lb.

Mature potatoes fry to a crisp, light golden brown. And they pick up less cooking oil, which varies from 30 to 40 percent of the weight of the chip.

Operations start with the curing of selected spuds under carefully controlled temperature and humidity in storage rooms holding 2,000,000 lb. While the temperature and humidity vary with the season and variety of potato, they generally run about 72 deg. F. and 65 percent. This curing temperature is sufficient for de-sugaring many varieties so that they will fry to a light-colored, marketable chip.

Cain's two storage rooms provide

Taking advantage of process innovations over the years, New England "potato chipper" has upped output 20 times within a quarter century

greater flexibility in the curing of the tubers, which can be switched from room to room depending upon heat or humidity requirements.

For efficient ventilation, air is brought in through openings in the floor of the storage rooms. These 12x12-in. openings are covered by iron gratings and spaced 10 in. apart. Air ducts below the floor are hooked up with 12-in. fans—two to a room.

At present, spuds are manually dumped from 100-lb. sacks into a 2,000-lb. capacity pit. The firm is in the process of improving its potato-handling by doing away with this laborious task. Instead of coming in textile bags, spuds will be directly shipped from farms in 1,500-lb. capacity wire crates and then handled in and out of storage by fork-lift truck.

### Peeled, Sliced, De-Starched

From the pit, a mercury-switch operated flight conveyor feeds 70-lb. batches of potatoes at a time to a hopper directly above an abrasive-type peeler. Spuds go from hopper into peeler by opening a hand gate. Each time the gate falls back into closed position, it trips the mercury switch which, in turn, starts the conveyor feeding another batch of spuds into the hopper.

Leaving the peeler, potatoes are inspected. Those over 3¼ in. dia. are cut in half, since excessively large slices slow down packaging operations due to "bridging" in the weighing-filling machines and in the cellophane bags.

Trimmings are chuted through a floor-opening and into an 8x3x3-ft. basket. Two benefits are gained by this simple system of gathering the peelings: (1) Clogging of the sewer system is eliminated and (2) the firm gains an additional small revenue by selling the reclaimed trimmings as hog feed.

A bucket-type conveyor now brings the spuds to a 3-bladed rotary cutter that turns out 1,500 slices per min. According to the variety processes, thickness of the slices can be altered by simple adjustment on the slicing machine.

Keeping the blades on the slicing machine sharp is a must at Cain's. For, if the blades are not sharp, a poor quality chip will result—ragged slices pick up more cooking oils and therefore produce soggy chips.

As a further quality safeguard, free starch adhering to the slices is removed by tumbling them through a sufficient force of water in a 10-ft.-long rotary washer with ¼-in. perforations. Starch water is discharged into the sewer, and rinsed slices continue along a 3-ft. wire-mesh belt, where they get another rinsing from overhead water sprays.

Air jets blow excess water from the slices before they enter the 22-ft.-long continuous oil-fired fryer.

### Frying Is Continuous

This unit comprises a 22x4-ft. combustion chamber with walls of a special pressed brick and insulating material. Automatic safety regulators cut off the five burners whenever temperature of the cooking oils gets too high. Also, gas is exhausted from the combustion chamber.

Six 1x10-ft. reciprocating-type metal rakes alternately submerge and turn the slices for uniform frying as they are moved along through the hot cooking oils. Condensation arising from the frying zone is trapped in a chamber within a stainless steel hood. In this way, deterioration of the cooking oils is checked.

As a further quality-control measure, cooking oils are continuously circulated from an adjacent stainless steel supply tank and filtered twice daily through a Cuneo-type unit. The latter comprises a series of horizontal stainless steel plates, arranged so as to prevent residue from passing between them.

Chance of fat deterioration is not a major problem because of the high production rate and large amounts of oils picked up by the chips. In any event, chemists check the cooking oils weekly for free fatty acid content and peroxide values—indicators of fat deterioration.

Before leaving the fryer, chips are conveyed a short distance on a wire-mesh belt for draining of excess oils. Chips then continue under an automatic salter—a unit comprising a supply hopper with a corrugated feed roll.

### Operations Coordinated

Flexible, electronic d.c. motor drives permit coordination of the performances of slicer, washer, and fryer. These drives play a significant role in making production continuous on this 75-ft. line by assuring variable-speed performance through adjustment of voltage from an a.c. supply to d.c.

At Cain's, the electronic motor drives control (1) speed in and out of the slicer, (2) length of the de-starching operation, and (3) rate of the fryer. Lack of proper coordination of drive function would result in adverse quality changes due to inadequate de-starching or frying.

The control station is located at discharge end of fryer. From here, the operator starts and stops the fryer and controls the speeds of all drives. Any change the operator makes in the fryer speed likewise affects the slicer and de-starcher proportionately.

Basically, this system, of GE make, operates in this manner: Power (a.c.) goes to the anode transformer. The transformer windings supply voltage for the control tubes and power for the motor-arm circuit through the larger armature circuit tubes as well as power for the motor-field circuit through the smaller field-circuit tubes.

Gas-filled, grid-controlled tubes (thyratrons) for armature and field circuits convert a.c. power to d.c. Voltage (d.c.) is made adjustable by control of the grids. Vacuum tubes of the "brain" circuits provide for the grid-control function.

### Special Overflow Chute

A 30-ft. wire-mesh belt cools the chips as it conveys them to a Buna rubber transverse belt feeding four packaging machines. This special rubber belt is impervious to oil and salt, and it is easy to clean. Overflow from this 30 in. x 33 ft. belt is discharged to a stainless steel chute for bulk-packaging in 3-lb. cases.

Three benefits are reaped with this chute:

(1) Overflow is kept at a minimum to permit more efficient operation of packaging machines. Formerly, last machine on line ran at a variable rate due to changes in flow of chips.

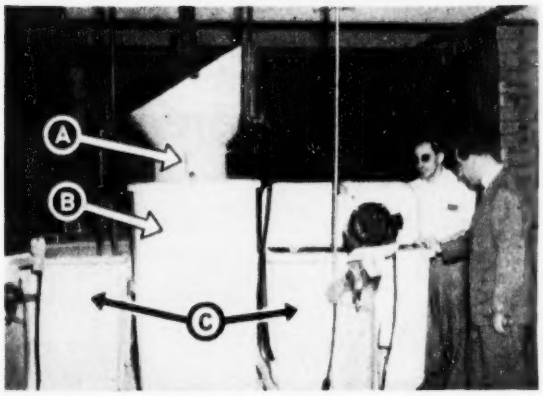
(2) Bulk-packaging is almost 2½ times faster than with former method of packing them at the end of the continuous fryer.

(3) There is less breakage of chips.

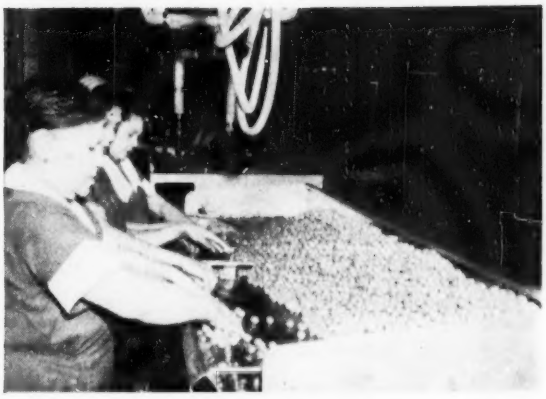
Three high-level feeders—one above a pair of Wright Hy-Tra-Lec machines and one each for Woodman Air-Weight units—automatically maintain a pre-set level of chips for constant feeding to the net weighers. When potato chips run below this level, an arm trips a mercury switch that operates a series of 8x4-in. paddles mounted on a chain belt above and at right angles to the transverse conveyor. These paddles scrape potato chips off the conveyor and into the high-level feeders. In addition to positive feed control, the paddles have the advantage of not breaking the chips, as does a flow-diversion plow.

In turn, these feeders deliver the potato chips to two vibrating feed trays supplying the net weighers. With employment of gross and dribble feeds, chips are weighed and filled into cellophane bags, which then continue to automatic bag sealers of the Amsco and Doughboy type.

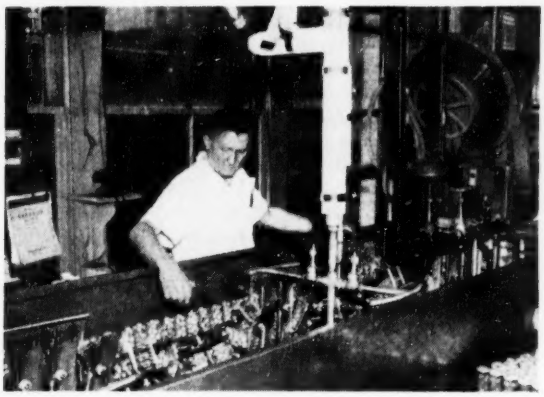
Speed of the Hy-Tra-Lec units is about 25 bags per min. (½ to 2¼ oz. sizes). Rate is the same for 6-oz. bags on the Air-Weight machines.



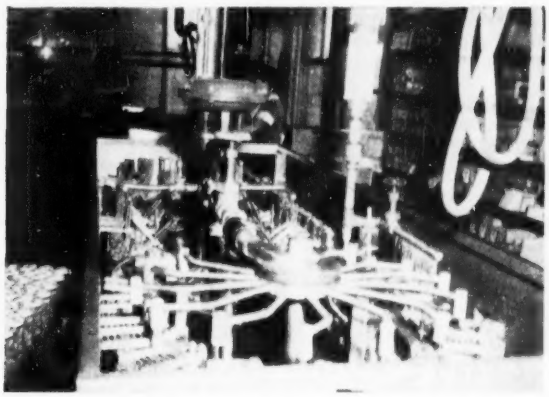

**BRINE MAKING.** Saturated brine prepared in Lixator (A) flows into holding tank (B). Brine is then diluted in Fiberglas-and-resin reinforced mixers (C).



**OLIVE PACKING.** Empty jars are conveyed from unscrambler to specially-designed, stainless steel packing table. Packing is simplified and continuous.



**WASHING.** Jars of olives continue to automatic washer. Four times they are filled with water and inverted for rinsing. Unit eliminates hand-washing of jars.



**BRINE FILLING.** Gravity-fed from floor above, brine flows to this 12-head rotary filler. Speed has been stepped up from 40 to 60 jars per min.

# Faster Brine Making and Filling

Using automatic brine-maker and special corrosion-resistant mixing tanks, olive packer gets constant flow of filler with less labor, ups line output 50 percent

**JOHN V. ZIEMBA**
Associate Editor, "Food Engineering"

Gain one advantage by modernizing a unit operation—and it's a good bet that you will reap several other benefits along your production line to boot.

Vita Food Products, Inc., New York City, certainly did.

Initial step at this firm's plant was to switch from a manual to an automatic method of preparing the brine used for packing olives. Then a low-cost, corrosion-resistant, sanitary system was installed for mixing and feeding the brine to the filling line. And thus the company was able to speed up its olive line because there was now a ready supply of brine at all times, flowing in without any waiting.

Before elaborating on the new brine-making and filling system, let's briefly consider the old method: Approximately 160 gal. of brine were prepared in an empty olive cask by one man using a wooden paddle. Each cask of 28 deg. sal. brine was enough for an hour's run on the filling line. This meant that brine had to be made up eight times a day.

Brine then had to be dumped from casks into the hopper of the filling machine—a back-breaking task that was not enjoyed by the brine-makeup man.

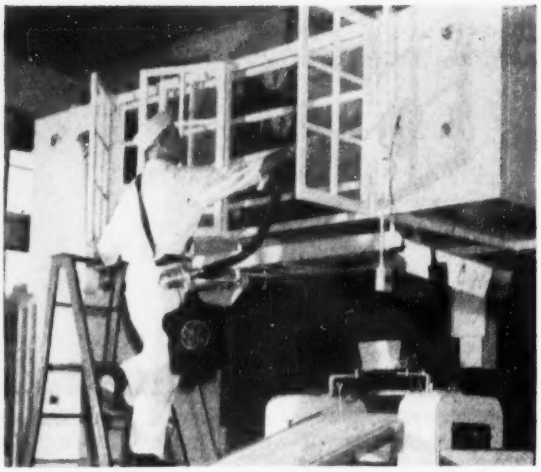
Speed on the old olive-packing line was 40 jars a min. Nine workers were required—4 for washing empty jars, 3 for packing olives into them, and 2 for labeling.

On this old line, jars were hand-washed in a stainless steel tank, loaded on an accumulating table to be filled with olives, and then fed to a six-head, reciprocating-type, vacuum brine-filling machine. Jars then continued to a single-head, rotary capper, through a short water-spray tunnel, onto an accumulating table, and then to two semi-automatic labeling machines.

## About the New System

With the present method of preparing brine, 1,000 gal. are made up twice a day in the same space.

(*Turn to page 177*)



**KEY STEP** in banishing insect infestations is a good cleanup program. Portable vacuum cleaner enables sanitarian to suck up flour and dust in difficult-to-get-at areas. It's handier than stationary unit. Left photo: Author Ed Holmes shows Sanitarian Joe Stieferman, of Walter Freund Bread Co., proper cleaning of ledges. Right photo: Joe finds it a simple chore to clean out overhead proofer with portable unit.

# Tips on Curbing Insects in Plants

Here's the way to lick most of your pest problem with adequate cleaning techniques—following up with a sharp insecticide routine to do the rest

**TOM L. HUGE and EDWARD L. HOLMES**

The Huge Co., Inc., St. Louis

It is not impractical for a macaroni manufacturer to accomplish 70 to 90 percent of his insect-control by adequate cleaning methods—the least expensive way.

Mighty important is making certain that insect life does not propagate in those places that are physically difficult to clean. In addition to keeping the plant clean, several insecticidal methods should be employed.

But what are the best practices for keeping the plant clean?

## Vacuum Cleaner Valuable

A plant simply cannot be kept shipshape without the use of an industrial vacuum cleaner. It is physically impossible to brush or scrape out residues that accumulate in various parts of equipment. Suction is the answer.

In the past, many plants have used an air hose. It's inexpensive, yes. But it is not a good method. The air hose merely blows dirt from one part of the plant to another. A vacuum cleaner, on the other hand, sucks up material into a container, from which it can be discarded.

In addition to using a vacuum, along with brushing, scraping, and washing, it is necessary to first make many areas in a macaroni plant accessible for easy cleaning of inside of structures. This applies to other plants.

Surfaces of food-product zones should be frequently cleaned by regular sanitation crews. Other surfaces not contacted by foods during processing need the routine less frequently. But all areas, nooks, and crannies must be available with the use of simple mechanic's tools.

Stop and think whether or not there are inaccessible areas in your plant where semolina or flour can accumulate. If so, it's wise to do something about them. It is a rare piece of equipment or structure that cannot be made accessible in all places. Meanwhile, cracks in walls and floors and at the bases of equipment should be sealed with caulking compound.

Insecticides will be required as an aid for 10 to 30 percent of an overall insect-control program. For the macaroni plant, insecticides and chemical insect-control methods fall into three groups—contact sprays, residual sprays, and spot fumigants.

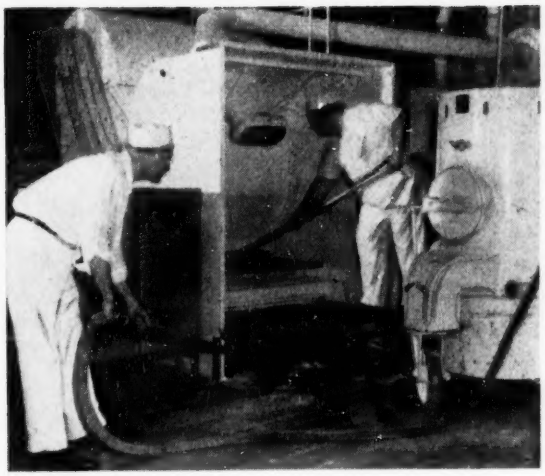
1. *Contact Sprays.* After much experimentation, this form of control has boiled down to utilizing minute proportions of powerful killing chemicals in an oil base. Such insecticides, under present day conditions, are considered most valuable in driving insects out of inaccessible areas, as well as killing them.

There has been a great deal of experimentation on toxicity to humans as well as insects. And for effectiveness on insects, pyrethrum and piperonyl combinations, commonly known as pyrenone, dissolved in an odorless base, are now considered the best contact insecticide for food plants. Various combinations and strengths of such preparations are recommended for food-plant uses, depending upon the needs.

## Getting Those That Fly

For example, space-spraying of house flies and other flying insects is accomplished with a fairly weak concentration, provided the proper dispersing agent is employed. Where it is desired to drive insects out of hidden crevices and kill them, a stronger solution is required. Depending upon circumstances, several strengths could be used to different advantages.

2. *Residual Sprays.* In recent years, another type of insect control has been developed. It involves "laying a trap" in the form of a dried, residual amount of insecticide on a surface for the purpose of killing crawling or flying insects. An insect flying about in a macaroni plant will seek a secluded place, free of light. Flies prefer hanging



**STATIONARY** vacuum cleaner furnishes sufficient power (7 hp.) for four hoses. Unit does a good job of cleaning such equipment as this flour blender, but clean-up crew is restricted by the length of hoses.

**FINAL** measure in keeping a plant insect-free is to apply insecticides. Tank-type portable sprayer has non-misting nozzle. It applies residual-type insecticide on walls. Solvent evaporates, leaves bug-killing residue.

light cords, corners of wall-ceiling junctures, or dark places on the ceiling. Roaches (with which we are most concerned) choose cracks and crevices in the basement, or unexcavated portions of the plant, particularly where they come in contact with moisture.

There are a number of residual insecticides especially developed for spraying areas where insects rest and breed. First ones used were very effective, but have since been found to be at least questionable as to their toxicity to humans. Most harmless to humans is a recent residual—a mixture of methoxychlor, which consists of lindane in certain proportions with another chemical.

So far, we have been considering insect-control methods involving surfaces—places that could be sprayed because they are nonproduct zone surfaces.

3. *Spot Fumigants, Insecticides on Product Zone Surfaces.* Here surfaces should never be sprayed with any insecticide that might leave a film or residue likely to contaminate some of the finished product.

However, there is an insecticidal technique, for food-contact surfaces inside of equipment, that is sometimes referred to as "spot fumigation" and occasionally as "local treatment" and "local gassing" of premises.

Generally, fumigating is too dangerous to be performed by any but professional, trained personnel. A few macaroni manufacturers have essayed their own fumigations, and as far as we know, no serious accidents have resulted. However, in other industries, there have been a number of fatal accidents in the use of such chemicals as methyl bromide and hydrogen cyanide or cyanide gas, which are the common general fumigants. *We do not recommend, therefore, that any macaroni manufacturer undertake a general fumigation himself.*

However, it is possible to use less harmful chemicals. These still must be handled with great care.

In fumigating individual pieces of equipment, certain fundamental requirements must be met:

First, the equipment must be as nearly tight as possible, for the chemicals vaporize before they become effective, forming a heavy gas that will leak out of cracks or openings in the equipment.

Second, carefully controlled application methods must be established. You cannot kill insects inside of equipment unless the layer of flour or semolina is less than 1 in. deep, 80 percent of the atmosphere inside of the equipment is saturated by the spot fumigant, and a sufficient length of time—about 4 hr.—is maintained for the fumigants to penetrate the insects' breathing systems.

## Some Suggestions

To meet these requirements, this well-established, effective procedure is advised: Apply 1 qt. of an ordinary spot fumigant—a mixture containing 75 parts of ethylene dichloride and 25 parts of carbon tetrachloride—to 100 cu. ft. of a fairly tight piece of equipment in such a way that the fumigant vaporizes completely in that amount of space. Allow it to remain for 1 hr. to do an effective job.

This "75-25" mixture is recommended because it is the least dangerous. Products known as EB5 and EB15 are sometimes added to the mix. EB represents ethylene dibromide, and the numbers are the percentages added to the "75-25" mixture. Putting in EB's makes for more danger in use, although they can be employed safely and satisfactorily by trained fumigators.

Recently, there has been a tendency on the part of some manufacturers to substitute propylene dichloride for ethylene dichloride without specifically saying so. This is not satisfactory, for although such a mixture might work, its use would require different dosages. Therefore, this product, although its formula is well known, should be only purchased from reliable manufacturers.

## Best Way to Fumigate

Biggest problem is in the use of liquid-type spot fumigations. Their effectiveness, however, depends upon being vaporized or formed into a gas within the equipment. If all the liquid were poured directly into the bottom of the equipment, some would vaporize above the layer of liquid, but not very much, for the weight of the vapor above the liquid would become so great that only a limited portion of the remainder would vaporize.

Hence, for effective evaporation, the liquid fumigant should drip slowly down the sides of the equipment, evaporating as it goes down so that only gas reaches the bottom. This layer of vapor then builds up from the bottom, at least to a saturation of 80 percent, so that if sufficient liquid is added, all of the inside volume will be filled with fumigating gas.

If the task is attacked with a sprayer that depends upon a current of air

(*Turn to page* 177)

**KITTEN** bottle's irregular contours defied machine filling and labeling.

**ELEPHANT** bottle retains novelty appeal, yet is easily handled on automatic units.

# "The Kitten Had To Go"

How package and production line were streamlined to convert sales success to practical and profitable plant operation

**WILLIAM E. MANKIN**
Sales Director, Grapette Products Co., Camden, Ark.

When Grapette Products Co. was organized early last year to produce and market concentrated beverage flavors in pint bottles for home use, marketing was simplified by availability of experienced personnel from its affiliated parent company.

**Production, on the other hand, proved to be a much more difficult problem, because–**

1. There were no reliable figures on which to base probable sales, and
2. Sales-minded executives had purchased containers that were unsuited for automatic filling and labeling.

## Bulk Setup Available

Packaging at the plant of the parent Grapette Co., Inc. (facilities of which were placed at the disposal of the new affiliate) had been restricted to 1 gal. jugs and 10-gal. steel drums used to supply beverage bases to franchise bottlers.

Obviously the drum-filling equipment could not be utilized to fill pint bottles. Therefore, the jug filler, which was designed to handle 12 containers simultaneously, had to "fill the bill."

At this point, it was discovered that the consumer package, a pint bottle sculptured in the shape of a sitting kitten, could not be handled on standard equipment.

Its top opening was not centered on the axis of the base, and so it could not be filled automatically. And its irregular shape defied machine labeling.

Special 12-bottle adaptors had to be constructed to hold the bottles in the proper place during filling. And adjustments were made to the filler to enable lowering of filling heads and delivery of desired amounts of syrup.

Adaptors were loaded by hand, next conveyed to the filler, where bottles were filled by vacuum, then moved out on the delivery conveyor. While they were still on this conveyor, a man quickly removed the adaptor, by lifting it from the bottles, and returned it to the loading station.

## Filling 2,000 Cases Daily

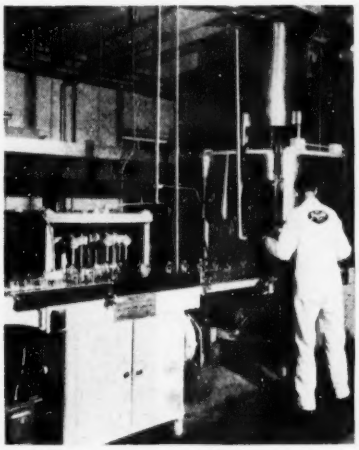
Screw caps were started on bottles by hand and tightened by power-driven friction cups, and labels were applied manually. Three men were required at the capping position and 10 to apply labels. To pack bottles in cases, and seal and mark the cases, required an additional 9 men. This added up to a crew of 22 men.

However, this makeshift line produced in excess of 2,000 cases (12 pt. per case) in an 8-hr. shift. But it was never able to completely satisfy demands from the seven markets being tested.

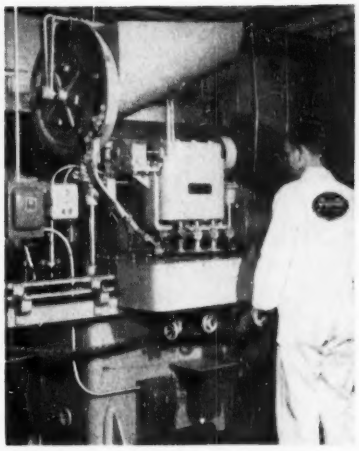
In the meantime, sales were so encouraging that company executives began to think about national distribu-

## How Modernized Line Operates

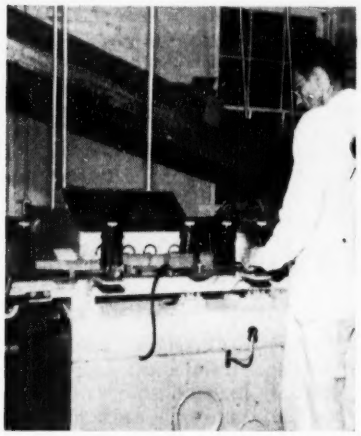
**BOTTLES** are uncased and aligned on chain conveyor. Belt (top right) moves empty cases to caser.



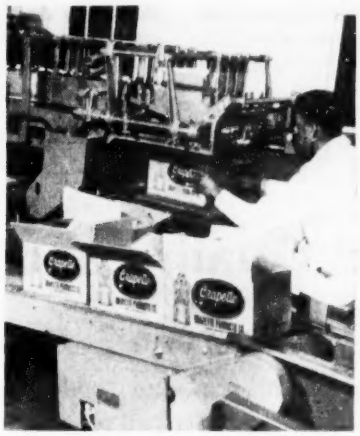
**EMPTIES** are air-brushed (left) to insure delivery of clean bottles to rotary vacuum filler (right).



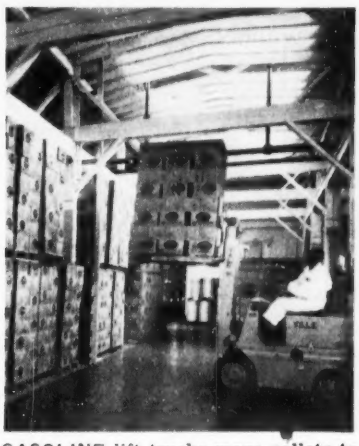
**CAPS** are automatically screwed on filled bottles as they proceed along the conveyor line.



**THERMOPLASTIC** labels are applied to flat area near base of bottle.



**NEXT** comes casing, coding, sealing of cases, then palletizing.



**GASOLINE** lift trucks move pallets to storage and shipping.

tion. But they now realized that such aspirations could not be fulfilled with present production facilities. So, before expanding sales territories further, packaging engineers from Owens-Illinois Glass Co. and several machinery manufacturers were consulted.

One decision was unanimous and quickly made: **"The kitten bottle must go!"** Not, however, the idea of novelty packaging. For we felt it was an important factor in attaining the large sales volume.

### The Elephant Bottle Evolves

Glass designers were invited to submit ideas for new novelty bottles having standard bases. Two designs were accepted, an Elephant and a Clown. Both have the same base specifications, height, contents, closure, and label area, and can be handled satisfactorily on modified standard equipment.

Choice of a labeler was long debated. The question revolved around "glue" or "dry" labels. We finally decided to use a new type thermoplastic label, and so purchased a Model 180 Label-Dri Champion labeler from New Jersey Machine Co., Hoboken.

Because adequate space was available, straight-line production was agreed upon. The following units comprised the finished bottling line: Biner-Ellison compact unscrambler; U. S. automatic bottle cleaner and rotary vacuum filler; Resina screw capping machine; the above mentioned labeler; Standard-Knapp automatic bottle packer and case printer; and A-B-C automatic case sealing and compressing unit. Overhead conveyors carry empty cartons from unscrambler to caser.

The new line has a capacity of 120 pt. per min.—600 cases per hour. It was first tested on a 1-shift basis. Then, as fast as additional personnel were hired and trained, production moved to two and, finally, a 3-shift schedule.

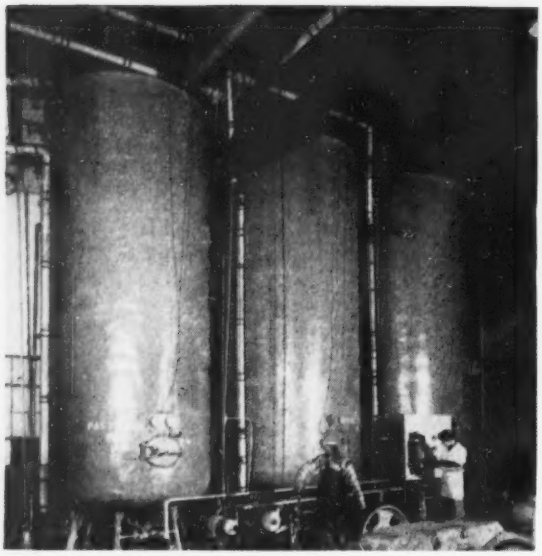
**By operating around the clock we are now able to turn out approximately 10,000 cases per day. Labor required per shift, has been reduced from the original 22 (on the makeshift setup) to 5—a saving of 77 percent.**

Fortunately, our syrup-making equipment has proved adequate even for our expanded needs. However, we plan to replace our 1,000-gal. mixing tanks with 2,000 gal. ones in the near future to permit longer aging of flavors before they are bottled.

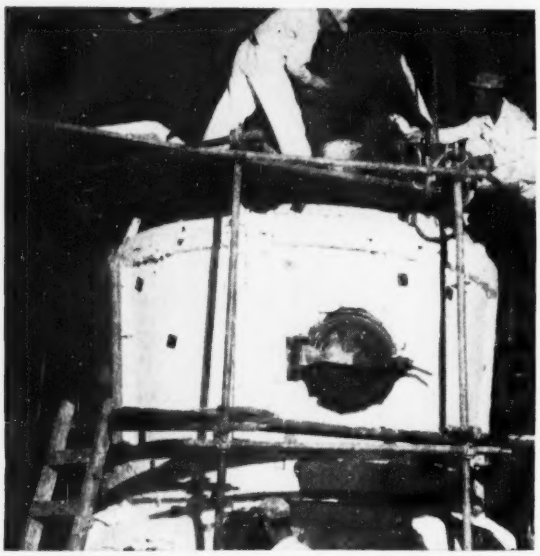
We know that the quality of our product assures success. Sales are given added impetus by the novelty type of bottles.

And, although these new novelty packages are no "circus" in the production department, we'll keep them as long as they help sell Grapette, Orangette, Lemonette, Lymette, Fruitette, Cherryette, Raspberry and Strawberry beverage syrups.

"Heat-Holders" Put to Work: On equipment . . .



**IN A WINERY:** Pasteurizing tanks are insulated with 2-in. blocks and given finish coats. (Roma Wine Corp.)



**SALT PLANT:** Large vacuum pan is insulated with 3-in. blocks, then finish coats are added. (Morton Salt Co.)

# INSULATING

## For Food Quality and Savings

Non-conductive material assures control of temperature —a major factor in processing. And exacting food-heat tolerances can thus be maintained. Here's how

**MARSHALL F. ALLEN**
Manager, Magnesia Manufacturers Assn., Washington, D. C.

Through use of thermal insulation, critical temperatures essential to quality food processing can be readily controlled. In addition to providing a means of temperature control, insulation pays for itself by reducing heat losses throughout the plant.

There is need for strict regulation of heat in the preparation of a multitude of foods, thus drawing the spotlight to the major role that insulation can play. Cited below are four pertinent examples:

In one stage during the preparation of non-acidic baby foods at the Gerber Products Co., plant, the temperature has to be held within a 2 deg. F. tolerance for 45 min. Below 240 would risk spoilage; above 242 would cause discoloration, off-flavor, and a loss in vitamin-content.

In a continuous deodorization plant of the Industrias Reunidas F. Materazzo, Sao Paulo, Brazil, 5,000 lb. per hr. of cottonseed oil are handled. Oils are highly heat sensitive and temperatures must be closely controlled at all times, particularly in the deodorizing tower. Here, the temperature must be held at about 500 deg. F., with a leeway of no more than a few degrees either way.

Pasteurization of wine at the Fresno, Calif., plant of the Roma Wine Co. takes place in three 18 ft.-high, 7,000-gal. stainless steel tanks. These tanks have to be maintained near 185 deg. F. (plus or minus a few degrees).

At the Fanny Farmer candy plant on the outskirts of New York City, special precautionary measures had to be taken so that the chocolate being transferred between processing stages would remain liquid. Any drop in temperature would mean settling out of the higher-melting-point constituents, and a consequent clogging of the lines.

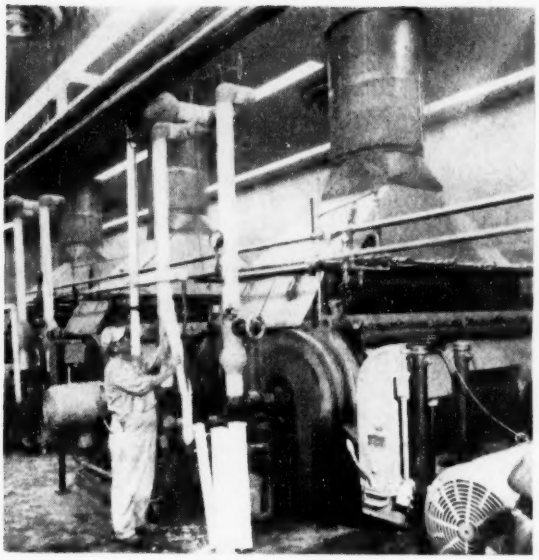
Thermal insulation, properly applied and maintained, supplied the answer to the problem of critical temperature control in cases just mentioned. At the candy plant, for example, melted and tempered chocolate is distributed and recirculated through special process lines that are kept at optimum temperature through application of 3 in. of 85 percent magnesia insulation. In addition, a low-voltage current is applied to the pipeline to compensate for heat lost by the chocolate in transit.

### Used on Tanks

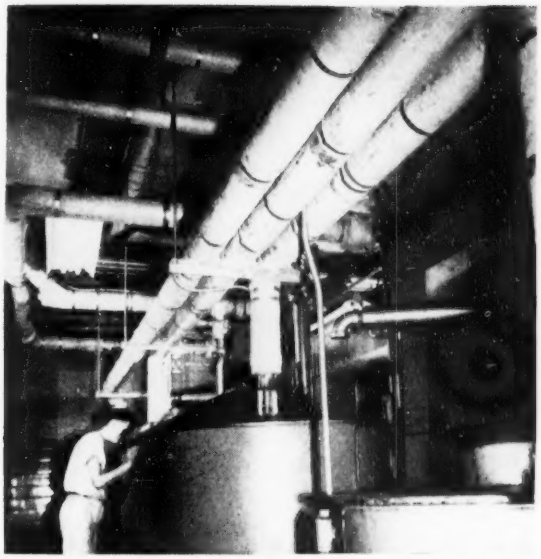
Stainless steel pasteurization tanks at the wine plant were insulated with 85 percent magnesia, 2 in. thick. The same material was used to insulate the deodorizing tower at the edible oil plant. Based on the tower's operating temperature, a 3-in. thickness of insulation would have been sufficient. However, the plant owners considered temperature control to be so vital that they specified an extra inch of insulation as a precautionary measure.

In the Fremont, Mich., Gerber plant, steam and return mains and branch piping to process and heating equipment were given the same insula-

## . . . and pipelines



**BABY-FOOD PLANT:** Main steam lines to drum dryers in cereal room are being covered. (Gerber Products Co.)



**CANDY PLANT:** To keep chocolate flowing, lines are insulated, heated electrically. (Fanny Farmer Candy Shops)

tion. On pipe sizes up to 4 in., a nominal 1 in. thickness of insulation was applied, and a nominal 1½ in. was used on larger piping. Fittings, valves, and high pressure traps were insulated with the same thicknesses. And the insulating material was also applied to outdoor ductwork at this plant.

Here's an example of the savings possible by reducing heat losses: In a plant operating for approximately 5,000 hr. annually *just 1 ft. of uninsulated 6-in. pipe* at 300 deg. F. above ambient air temperature can waste about 800 lb. of coal per year. If this pipe temperature must be maintained 24 hr. a day, every day of the year, the coal loss due to lack of insulation amounts to nearly 1,500 lb. annually per pipe-foot.

To give a more specific example: In a well-known milk plant, the hot water converters for a battery of pasteurizers and the pasteurizers themselves are located on the third floor. Steam generating equipment is in the basement and at the other end of the block-long building. For 1 lb. of saturated steam to reach the outlying pasteurizers, it has to pass through 200 ft. of 5-in. piping at 100 psig.; 100 ft. of 4-in. piping at 70 psig.; and, finally, through about 30 ft. of 2-in. piping at 15 psig. Assuming (for the purpose of illustration) that all this piping was left bare, the heat losses would total 315,900 Btu. per hr.

If these 330 ft. of pipe were insulated with only a minimum thickness of 85 percent magnesia, the total heat loss would amount to only 40,934 Btu. per hr.—a reduction of more than 87 percent. Thus, in one year of continuous operation, figuring the cost of heat at 60¢ per million Btu., the insulation on this piping alone saves more than $1,446 in fuel costs.

Similarly, a typical 500 gal. pasteurizer, having an O.D. of 6 ft. and a 4 ft. depth, and jacketed with 180 deg. F. water, represents a heat-loss surface of roughly 132 sq.ft. If instead of leaving the pasteurizer bare, insulation with a nominal 1-in. thickness is used on this single unit it will eliminate "wasted heat" equivalent to about 12 tons of coal per year.

### How It's Applied

Food processing equipment is usually insulated in the following manner: First, all surfaces are prepared—any scale, rust, or debris is removed, and all couplings and fittings made pressure-tight. Blocks of insulation of the appropriate thickness are then cemented onto the equipment, with all joints closely butted and pointed up with insulating cement. Where the equipment is expected to reach fairly high temperatures, a double-layer construction is preferred, since it permits a staggered-joint construction that eliminates open joints at atmosphere in case of equipment expansion.

Thickness of insulation to be applied will depend on the operating temperature. Where temperatures are extremely critical, however, these thicknesses may be increased (as they were in the case of the deodorizing tower previously mentioned).

After the insulation blocks have been cemented into position, cables or bands are strung to fasten the insulation securely. In the case of a double-layer application, annealed iron wire is generally employed to hold the first layer.

Following the second layer, wire mesh is applied over the insulation—to serve both as additional support for the blocks and as a base for the two following coats, comprising ¾ in. asbestos insulation and hard finish cement. The second coat of cement is troweled smooth to give a neat appearance to the insulated equipment.

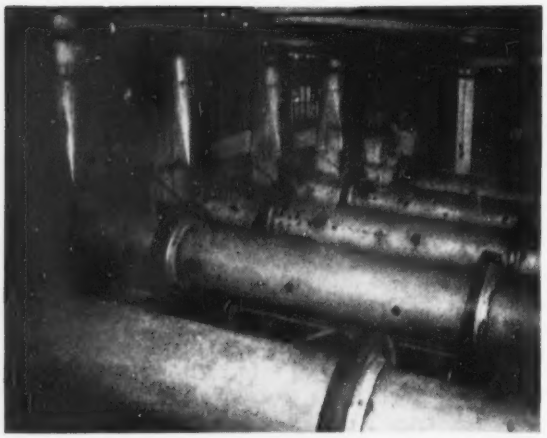
On conical or cylindrical vessels, or vertical surfaces, especially if fairly large, it is advisable to provide some means of support for the insulation to prevent slipping. Stud bolts or hexnuts are sometimes welded onto the equipment, spaced at regular intervals. To these, insulating blocks may be wired. At other times, angle iron "rings" are welded circumferentially around the vessel. On these the insulation may rest.

This latter method usually is employed where expansion joints are provided to prevent cracking of the insulation. The rings are spaced in such a manner that a single length of insulation, resting on the lower ring, will reach to within ¾ in. of the next higher ring. The space thus provided is filled with fibrous material that compensates for the expansion.

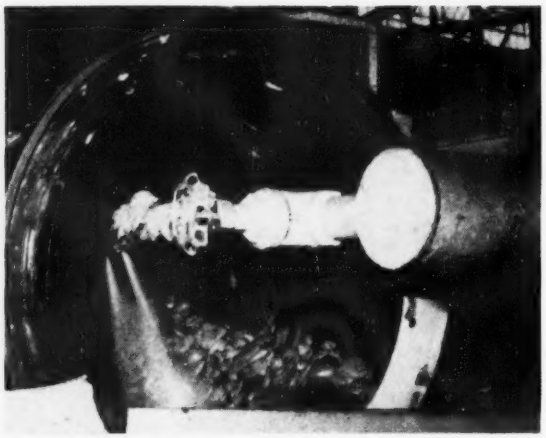
On piping, sectional insulation is used for the smaller sizes; segmental insulation for the larger. Two basic types of finishes are most frequently

(*Turn to page 201*)

**Roasting plus washing removes skins . . .**



**1** Gas-fired roasters (20 in. dia. by 18 ft. long) loosen tough outer skins of peppers in 3 min.



**2** Then cold water sprays remove charred skins, and wash them through openings in rotating screen.

# PIMENTO CANNING

## *Gets a Technological Boost*

Advanced engineering and continuous production reduces hand labor and increases output, yet product retains desired quality characteristics

**E. DALTON WHITE**
FE Correspondent, Atlanta

Big factor in the efficient pimento canning operation at Pomona Products Co.'s, Griffin, Ga., plant is flexibility of production lines and application of new machinery as soon as it is perfected.

In fact, the plant is so engineered that production lines can be switched from one product to another without interruptions. Also, it is able to process more than one seasonal product at a time, or handle vegetables and fruits in seasonal rotation.

From unloading fresh products off motor carriers and farmer's trucks to loading cases in rail cars and trucks, the most modern materials handling equipment and methods are employed.

The plant has grown in size and scope as fast as improved and perfected machinery could be engineered to fit into the operation. Each such step has brought modifications of production lines to speed product flow on a continuous basis.

For example, this past canning season saw installation of 24 newly designed Altman automatic pimento coring machines. Each unit removes cores from four pods per cycle, a total of 120 pods per minute. And, although each corer requires two operators, labor savings are real.

Also new this season is the special production line to prepare pimentos for cheese processors. In this line, graded peppers and pieces from other production lines are collected on conveyors and go directly to huge cooking kettles, where they are specially prepared. Then they are emptied into double plastic bags fitted in tin containers. Bags are heat-sealed to preserve the freshness and rich flavor.

### Processing Detailed

Pimento packing time is a busy period at Pomona Products, with more than 1,000 people employed.

Peppers are graded as they are unloaded from farmer's trucks. All under 1¼ in. are rejected, the remainder are processed. Those that show perfection in size, conformation, color richness, texture and taste are separated and their seeds removed and dried for the next year's planting. The others are stored in a shed for at least one day for further ripening and seasoning before processing. A fully ripe pepper is rich in flavor and has a deep red color and firm texture.

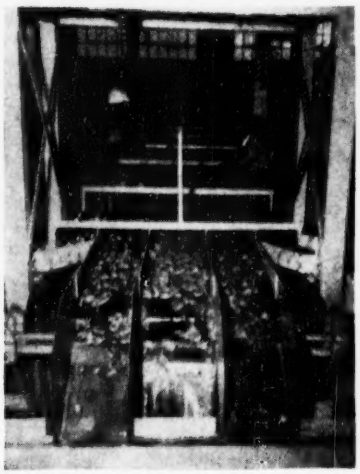
Peppers selected for seeds are hand cored and roasted on a special production line, then enter regular lines for further processing.

The modern method of roasting pimentos to remove tough outer skins is a great improvement over the former hand roasting that originated in Spain. From individual roasting over charcoal, the process has developed into a mass basis, with gas as fuel, fired into 20-in. dia., 18-ft. long cylinders. These rotary roasters, with variable speed drives were designed by Pomona. It requires 1-3 min. to adequately char the peel for subsequent removal in rotary cold water washers.

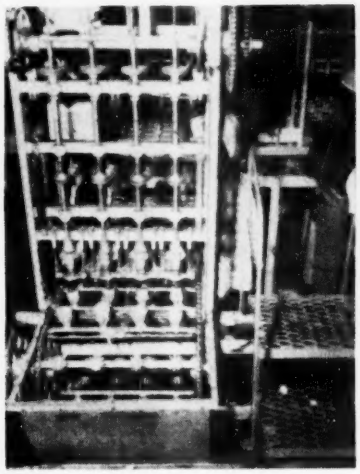
From the screen washers, pods are conveyed to hand coring or to automatic coring machines. Pods not cored on the first pass are re-circulated to insure a continuous supply to the coring belt tables.

From coring, pimentos drop by conveyor onto belt pickers, where spots and defects are removed before the pods are sent through two rotary cold water washers. These 18-ft. screen washers turn at slow speed to insure thorough cleansing. Pimentos next go through the steam wilter, remaining on the 24-ft. mov-

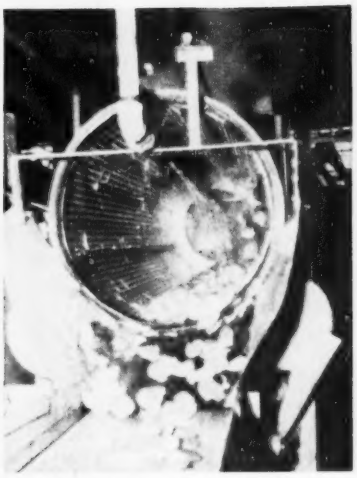
## . . . then comes coring, packing, processing



**3** Cores and spots are removed by hand, pods move to wilters.

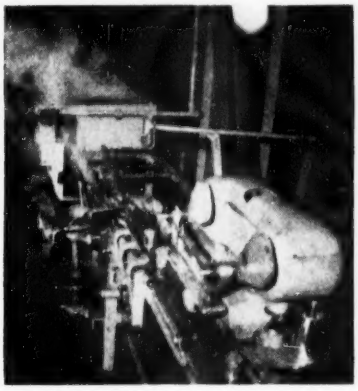


**4** New Altman automatic units core 150 pods per minute.

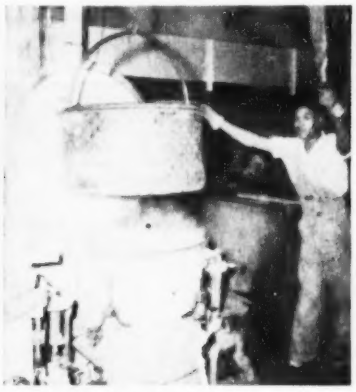


**5** Wilted peppers are cooled by water sprays, go to packing.

**6** Pimentos are graded and packed in jars and cans as they proceed along continuous line.



**7** Filled containers go through steam exhaust box (rear). Excess water is removed (foreground).



**8** Cooking of glass-packed peppers is in retorts. Tins pass through continuous open cookers.

ing line for 3 min. under mild steam, then receive a cold water rinse prior to selection and packing.

### Packed in Glass and Tin

Pomona packs sliced pimentos in 2-oz. glass containers; whole pods in 4- and 7-oz. glass and in 4- and 7-, and 14-oz. tins. Whole pods and pieces are also packed in 2½ tins. Bits and broken pieces are recleaned and packed in 2½'s for manufacturers.

Production lines are engineered to allow pimentos to travel continuously by belt conveyor from one packing table to another as selection is made for each particular grade and size. Sliced pimentos are packed on a separate line.

From packing, jars and tins go to retrovel steam exhaust boxes, where the temperature is raised to about 150 deg. F. before sealing. Surplus water is drained from the peppers as they move along the belts so that pods are relatively dry when placed in containers.

Following sealing, 2- and 4-oz. glass containers are placed in retorts and are processed for 12 min. at 240 deg. F. Jars are allowed to cool to 120 F. in the retort before placing in the continuous cooling vat.

Tins are processed in the continuous cooker at open boil—the 4-oz. 35 min.; 7-oz. 45 min., and 2½'s 90 min. Cooling takes place in the continuous cooling canal for 35 min., the cold water flowing in the opposite direction to the moving tins.

### Labeling and Packing

Cooled tins and glass containers go by belt conveyor to labeling and boxing. Most of the pack is loaded into rail cars or motor carriers for direct shipment. Thus Pomona effects considerable savings in storage space.

Special care is exercised during processing to preserve the flavor, color, and texture of the ripe peppers. This is especially true in the cooking, for over-cooked peppers become soft and mushy.

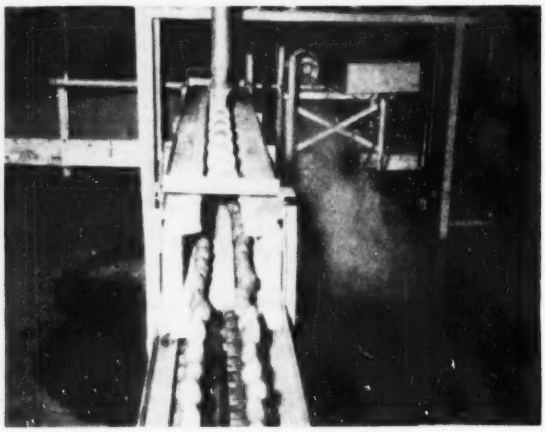
Development and processing of pimento peppers in the U. S. started near Griffin, Ga., about 50 yr. ago, when S. D. Riegel & Sons, who operated a truck garden, imported some seeds from Spain. Selected breeding over the years resulted in the Perfection variety, considered much improved over the Spanish variety. The fruit is pointed, exceedingly mild, and is a deliciously flavored sweet red pepper. It has thick meat and has a brilliant scarlet red color.

The nearby Georgia Experiment Station in 1936 undertook further experiments and by 1942 released a new variety, the present Truhart Perfection, a superior pepper which has now nearly replaced the other varieties grown in Georgia. It is a thick-walled, heart-shaped, dark red pepper with smooth shoulders at the stem end

## Special Operations Feature Pomona Plant

**FOR USE** in process cheese, pimentos are cooked in huge kettles, then filled into plastic-lined tin cans.

**LINERS** are heat-sealed by electric unit (left) to protect quality of can's contents until opened.

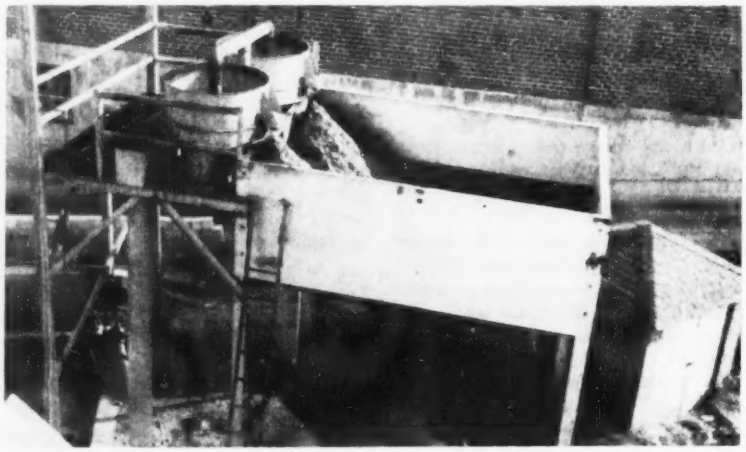


**SPECIMENS** selected for quality are hand-cored and seeds dried for distribution to growers. These cored pods are placed on conveyor-mounted spikes (left) that move them to gas-fired oven (right) for removal of skins.

and has a moderately pointed apex.

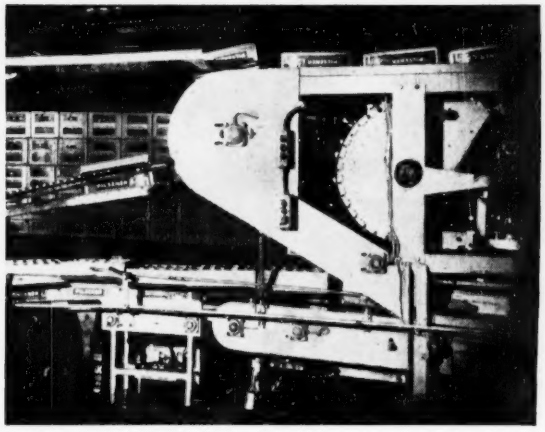
Prior to 1920, practically all pimentos offered for sale in this country were imported from Spain. It was in 1918 that Mark Riegel invented machinery for roasting the pimento to remove the skin. The first plant in the U. S. was then set up at Pomona, a few miles from the present plant in Griffin. The following year, Pomona Products Co. was founded with Walter Graefe, now president of the company, as manager.

Pimento growing in Georgia has steadily increased over the years, and the crop is now one of the most important. In fact about 75 percent of all acreage in pimentos in the U. S. is planted in Georgia. Pomona Products Co. terms itself the world's largest packer of pimentos.



**BEFORE** discharging to the sewer, wash and processing waters are pumped to the two vibrating screens (left) for separation of solids.

**Cases of Empties (→) . . . Empty Cases (←) . . . Bottles to Washer (↓)**



**ON LOWER** line, cases of empties enter moving right. Empty cases, right-side-up, leave via slope going left.

**BOTTLES** are deposited by wheels (background) on conveyor and mashalled into orderly ranks to supply washer.

# Robot Speeds and Eases Case, Bottle Handling

It's "bottoms-up" with nearly 1,000 bottles a minute as Duquesne puts new automatic case unloaded on the line. Unit provides swift, safe movement of bottles to washer

**FE STAFF**

Another tiring task in brewing operations has been eliminated with introduction of a new automatic uncaser at the progressive Duquesne Brewing Co., Pittsburgh.

Easing the workers' tasks, the new machine assures a continuous flow of bottles to the washing equipment, effecting substantial savings in operating cost. Currently, the unit is being augmented to feed two bottle washer simultaneously.

### Started in Dairy

An RCA product, the machine embodies all the basic features of the original uncaser developed for the dairy industry. Here, it has been especially adapted to meet the needs of beer bottlers. Special retainers are incorporated to hold open the lids of cases as they pass through the uncaser. Endless chains invert the cases and carry them in this position for a short distance after the bottles are removed, allowing any debris collected in them to fall into trash receptacles.

Simple in principle and construction, the unit features automatic controls for preventing bottles from jamming and for stopping the equipment if faulty cases or improperly positioned bottles are fed into it.

Initial experience with this first installation is already bearing out the promises of economy and increased efficiency, according to S. W. Koenig, vice-president in charge of purchasing and production at Duquesne.

"We find in it," he reports, "a solution to many of the problems encountered in bottle handling. We are gratified that we have had the opportunity to pioneer in this advance in brewing practice."

This particular machine handles 12-oz. export bottles. Models are available which can easily and quickly be adjusted for various types and sizes of bottles and cases. The maker states these machines will process in one minute up to 40 cases of either 12- or 24-bottle size, whether designed to hold three or four rows of bottles. It can be made to service wooden, metal, or cardboard cases.

### Working Details

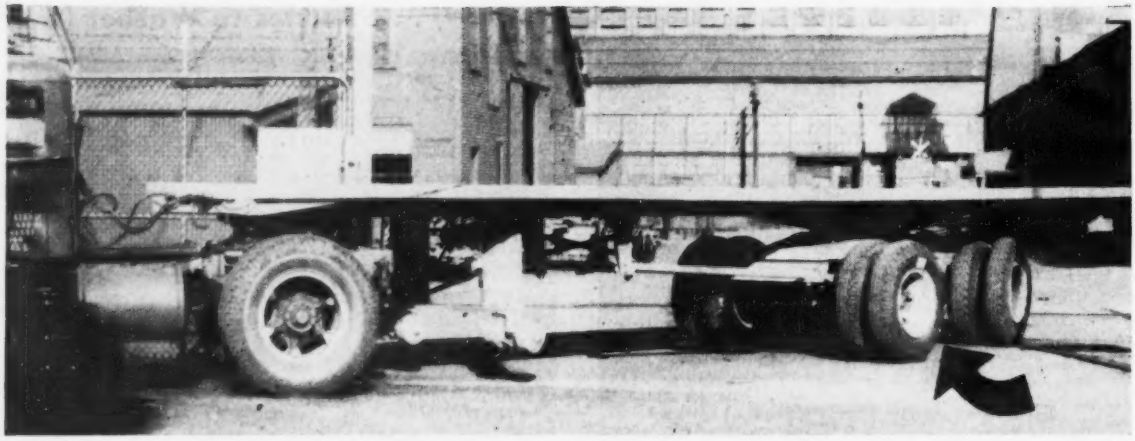
In operation, cases are fed in directly from the plant case-conveyor. Entering the lower portion of the unit, they are carried upward and inverted, with bottles held safely in place.

As the cases continue through the machine, they reach points at which first the inner rows of bottles and then the outer rows are gently lowered into large revolving transfer wheels with pliable rubber gripping surfaces. The first wheels firmly grasp the bottles in the center rows as they are released, while the second set of wheels takes bottles in the outer rows. As they turn, the two wheels deposit the bottles on conveyor belts, which deliver them to the washer-loader.

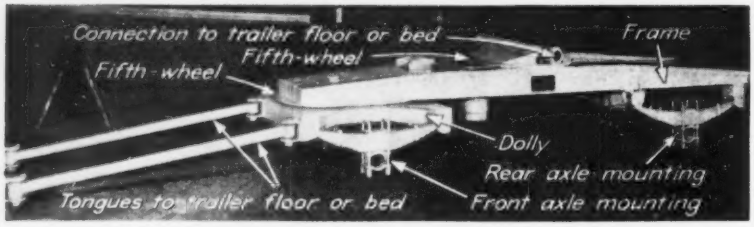
For a short distance, after the bottles are removed, the cases are carried in an inverted position permitting most of the debris to fall out. Debris is collected in built-in trash bins.

Thereupon, the empty cases are set right-side-up and delivered either to a conveyor or are spotted alongside the machine. In the washer-loader unit, the bottles are spread to full width of the automatic washing equipment, and then are guided into as many channels as required.

The machine incorporates a control that automatically keeps an adequate supply of bottles ready to enter the washer.



**STRIKING** turning and following performance of wheels (arrow) is prime feature of new trailer undercarriage.




**SHARP CLOSEUP** puts spotlight on maneuverable-plus, payload-boosting unit.

# *Payload-Upping* Trailer 'Carriage

## Self-steering, it turns better, too . . . Also is hailed as tire and fuel saver as well as safety promoter

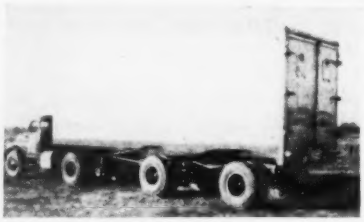
SEVERAL THOUSAND additional pounds are carried—in those states where motor vehicle laws allow credit for wide spacing of tandem rear axles —by a new self-steering trailer undercarriage.

What's more, the special unit gives vital extra-maneuverability in narrow streets, extends tire life, and promotes fuel savings and added safety.

At present, the undercarriage is most advantageous on vehicles operated in Ohio, Michigan, and Wisconsin, in that order. Even though the unit scales 1,500 lb. over the weight of the conventional tandem rear axle it replaces, the net increased payload that thus can be hauled in Ohio is 5,000 lb., with lesser amounts in the other two states.

Variations in increased payload capacities are due to the differences in the state laws concerned with such factors as axle loadings, gross overall weight, overall length, use of the "bridge" formula, determination of permissible weight on a group of axles, based on spacing, the use of two- or three-axle tractors, etc.

In Ohio, the "tractor semi-trailer" has been limited to an overall length of 45 ft. However, in that state, trailers equipped with the new unit are designated as "mono-trailers", or as "other combinations", with length in excess of 45 ft. permitted.



**CITRUS FRUITS** and vegetables are hauled north from Florida with new efficiency in this Hoobler undercarriage-equipped 30-ft. Brown refrigerated aluminum trailer.

Though fleet owners and motor transportation companies continue their efforts for legislation permitting increased vehicle payloads, general liberalization of state laws will probably be a gradual process extending over years.

However, use of the new undercarriage is definitely advantageous at the present time on the basis of its notable extra features, as testified (photograph below) by runs of fruits and vegetables from Florida to the northern states. As for amounts of load increases in the three Midwest states, these can be determined by setting up specifications of the tractor-trailer trains in those states. Similar calculations for other states, in accordance with present or future liberalized laws, will range the higher loads possible.

Made by The Union Metal Mfg. Co., Canton, Ohio, the new equipment, known as the Hoobler undercarriage, may be installed under any type of trailer, van, or reefer such as used in the food industry. It replaces the common, rigidly attached tandem, 4-ft.-spread axle. Hobbler axles are spaced on 9 ft. centers.

### Details of Unit

As shown in our illustrations, its rear under-frame axle is spring-mounted directly to the frame. The front axle is similarly spring-mounted to an independent dolly that supports the front end of the frame and is attached to it through a trunnion that moves in a slot in the frame.

The dolly is towed and steered by means of two rods or tongues, the front ends of which are attached to the floor or bed of the trailer. Top of

(*Turn to page 200*)

Food Engineering's

# MEAT SPECIAL

## AND SHOW GUIDE

8 Progress Articles


Electrostatic Smoking 70

Armour Modifies Lard 72

Morrell Pools Packaging 74

Felin Prevents Fires 77

Modernizing Old Plants 78

Cudahy Robots Accounting 81

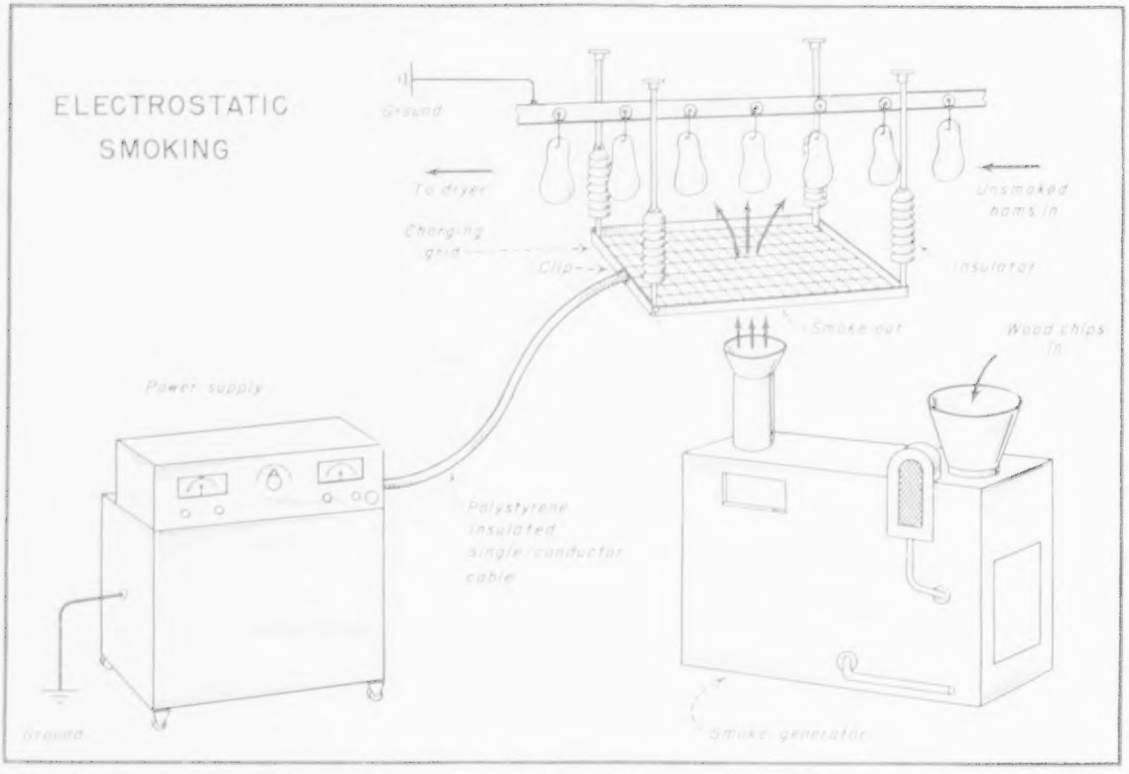
Cutting Cleaning Costs 91

New High-Vacuum Packager 97

Meat Show Directory 99



A Special Section of FOOD ENGINEERING, September, 1953




**STYLIZED** set-up shows hams moving through electrostatic smoking area. High voltage is applied to grid through compact power supply.

# ELECTROSTATICS CREATE

## Process time is telescoped from hours to minutes by high-voltage

**ROY E. MORSE,** Director of Research, W. J. Stange Co., Chicago.
**DAVID B. PIVAN,** Vice-President, Everett Associates, Chicago.

Many years ago it was discovered that finely divided solids, such as dust or smoke, become strongly charged when passing through a wire grid held at high voltage. Further, these charged particles could then be conveniently collected on an object held at ground potential.

This simple principle was quickly seized upon as the basis for today's highly efficient dust and smoke collection systems.

Electrostatic deposition was next put to work in the paint field. In the mid-Forties, the Ransberg group in Indianapolis found that charged paint spray particles would unerringly zoom to smoothly coat an object, even overcoming 180-deg. turns. This amazing application has revolutionized industrial painting.

Food engineers—with many analogous coating problems—cast an eager eye at the technique. In 1951, MacKenzie of Raytheon achieved some basic patents towards this end by directing smoke particles at 12,000v. onto meat and fish located in grounded mesh trays. More recently, a West Coast fish processor put salmon on a belt and did this continuously—condensing a normal few-hour operation to a mere 8 min.

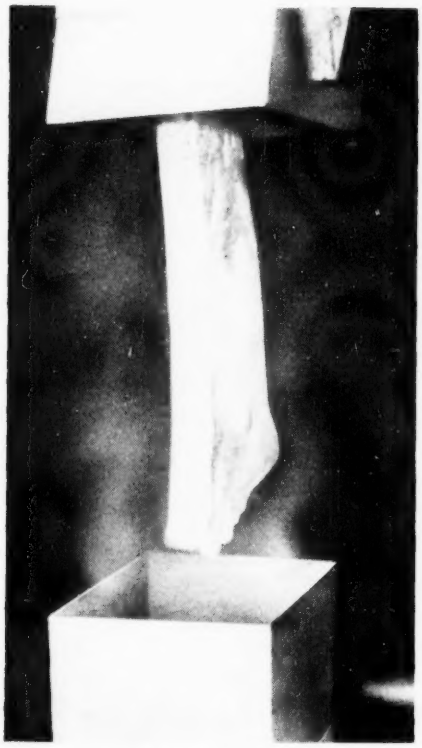
Meat packers became excited. Smoking has long been one of their most tedious, exasperatingly meticulous, and pretty much uncontrollable operations. Could the new technique trim the time and "ginerbread" from this process also?

Initial investigations by the industry indicate that electrostatic smoking of meats may actually exceed the fondest expectation. For one thing, the time-saving results achieved with fish also apply. And as "plus" factors the technique offers these benefits.

- **Almost complete utilization of a substantially lessened smoke volume.**
- **More easily controlled, highly uni-**

### Advance Information

**Quietly, but with eyebrow-arching results, several of our leading meat firms are probing the use of electrostatics to improve the tedious operations of smoke-curing. While in-plant data are, as yet, not for complete unveiling, results have been so promising that FE asked Roy Morse, former research director of Kingan and Co., and Dave Pivan, electronics expert, to briefly describe the new technique, some of its results, and its potential for the future.—The Editors**



BACON belly chutes through electrostatically charged smoke. Note how smoke cloud clings to meat.

## Other Applications

**Many applications in the food field appear fair game for electrostatics.**

**Smoking salmon by the method is already a commercial venture. And an Eastern firm now is investigating use of the process on other fish products. But looking broadly at the technique, it appears that it may find ready use in many operations where any food article is to be coated or sprayed.**

**Here, mainly as pure conjecture, are some potential applications which may stimulate other food manufacturers into adopting electrostatic deposition.**

1. **Chocolate enrobing of candies and cookies.**
2. **Application of molten sugar and other frostings.**
3. **Application of molten plastic to frozen foods.**
4. **Wax coating fresh fruits and vegetables.**
5. **Coating meat carcasses to prevent evaporation.**
6. **Coating oil or tin on steel plate.**
7. **Glazing fish or meat for freezer storage.**
8. **Deoiling deep-fried foods.**
9. **Adding humectants to dried foods.**
10. **Cheese or butter coating of popcorn.**

# "FLASH" SMOKING—COATING

technique which utilizes affinity of charged smoke particles for meat

**form smoke deposition on products.**
**▶ Greatly reduced costs through switch from batch to continuous.**

But tangible proof of these heady gains still is in the laboratories and pilot plants of the industry. So our comments here must understandably be confined to a discussion of the technique and its potential application to meat and other food products.

### Simple in Principle

First, the mechanics of the operation. How is the smoke or other coating charged? Why does it so decisively deposit on food?

We know from physics that particles can be electrically charged, and that there exist both positive and negative polarity. A positively charged particle has great attraction for a negatively charged particle, and vice versa. So if we charge the particle we are concerned with and direct it within reasonable distance of an object at opposite polarity, it should act pretty much as a "homing pigeon."

Now suppose we positively charge the smoke particles coming out of a smoke generator, and above this smoke cloud we pass hams on a conveyor system at negative or ground potential. The permeation then will not only be accomplished by smoke that accidently touches the ham, but by all smoke particles in the vicinity.

Even if a charged particle of smoke somehow manages to pass between two hams and go up, it is very likely to pause, turn about, and penetrate a ham at its top.

### High-Voltage Applied

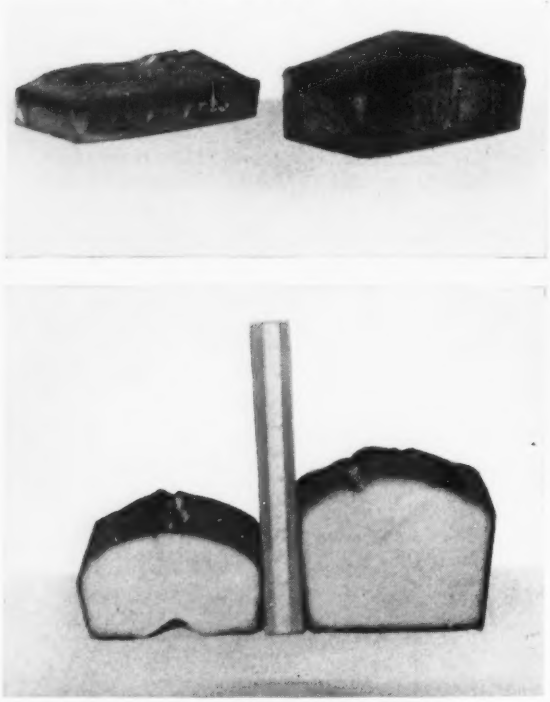
Actually, developments in the type and ability of equipment used to apply a high voltage to coatings has spelled the success of commercial operations. Experiments have indicated that in order to do an efficient job of ionizing or charging coating particles, a direct-current voltage of up to 100,000v. is required. Equipment producing this must be relatively inexpensive, safe, fully reliable, and also simple to operate.

Essentially, the power-pack transforms normal line alternating current to a very high voltage, and then rectifies it to direct current in a vacuum-tube circuit. This voltage then is applied by a simple clamping cable to the smoke charging grid.

Safety aspects are of primary concern when working with high voltage. However electrostatic deposition requires very small currents and can be limited to amounts that are not dangerous. As a matter of fact much higher voltages are experienced on a dry day when one touches a metal object after shuffling across a thick carpet. (*Turn to page 112*)

***Meat Special***

Ups Cake Volume



**DRAMATIC ADVANCE:** Pound cakes on left were made with conventional lard, those on right with new product.

# LARD SCORES AGAIN

Far-reaching Armour development—molecular modified lard—is demonstrated as first class for baking of cakes, also cookies, pie dough, and bread. Thus it's seen as a No. 1 contender in "all-purpose" shortening field

**LLOYD E. SLATER**
Associate Editor, "Food Engineering"

A champion often rests on past laurels. And for many years, lard—once the undisputed shortening—did just that. But as can be expected, strong contenders appeared. These have been vegetable-oil products, which have scored, in a series of spectacular technical K.O.'s, as new and better shortenings.

Today, however, lard is highlighting the news with a dynamic comeback. And the most recent significant achievement—Armour's molecular modification process—is seen speeding it to the top after all-purpose shortening honors.

Lard's progress on the comeback trail has become steady and sure. Its rendering and refining have vastly improved and, along with hydrogenation, have upgraded it for most baking and made it tops for deep fat frying.

Yet one tough obstacle has consistently barred all-out progress: Lard shortening still seemed to fall far short in producing good cakes by methods customarily used by baker and housewife.

When Armour's scientists set out to solve this poser, the patented process they came up with was mainly designed to produce a superior shortening for cakes, while retaining former desirable qualities.

**▶ But what has resulted hints at so many other improvements that it may well be the start of a virtual renaissance in lard technology.**

Essentially, the new process involves a change in the physical structure of lard as induced under moderate heat by a chemical catalyst. A rather gentle treatment, this produces a molecular modification that shows up, after plasticizing, as a uniform crystalline structure similar to the arrangement found in hydrogenated vegetable shortening.

But before detailing the process and its technology, let us briefly review historical facts leading to its development:

When, two generations ago, lard was universally accepted as *the* shortening, it accounted for about 20 percent of the value of a hog. But today, lard's skid in consumer preference has brought it down to the point where its return to the meat industry represents only about 7 percent of the total value of all products received from this animal.

It is obvious that once-profitable lard is now sold at a price far below that paid for it on the live animal. And since this product is an inescapable part of pork packing, is has become a matter of dire economics that the industry do something to upgrade its market.

Lard's inability to compete with vegetable oil shortenings has been multifold. It has been less uniform, with more odor and flavor than most consumers like. Further, it has displayed an alarming tendency to deteriorate by rancidification during storage.

## Technical Progress

Some very active research and engineering launched vegetable fats into the domestic shortening market in the 1920's. Primary was the process of catalytic hydrogenation of liquid oils to convert them into semi-solids at room temperature. Deodorization of this product was then developed to remove distasteful odors and flavors.

Various improvements were then rapidly added to vegetable oil refining, while meat-fat technology seemed to rest on its oars. The result was that by the mid-30's hydrogenated vegetable oils displaced lard in the public favor—and this despite a generally higher selling price.

Along with these technical advances, vegetable shortening had an inherent advantage over lard in its

**YOU'RE TAKEN "right to the new-lard line" in this month's revealing photo-and-diagram foldout presentation. Just turn to pages 102-105.**

naturally contained antioxidants, or tocopherols. For many years the Bureau of Animal Industry would not permit addition of chemical antioxidants to lard to level this situation.

However, in the late '30's the B.A.I. modified its policy and there was soon available a new lard protected by antioxidants—with rancidity resisting qualities equal to the best hydrogenated shortenings.

Another natural shortcoming retarded lard progress. Regional and dietary variations in animals, as well as a variable time factor between slaughter and fat processing, added up to a seemingly uncontrollable problem of non-uniformity.

A growing familiarity with the vegetable oil hydrogenation technique helped dispel this problem. By selective, partial hydrogenation, and careful blending with hydrogenated lard flakes, it became possible to achieve excellent lard texture and uniformity.

With the need finally aroused for better animal shortenings, improvements have cascaded in the past few years. Basic rendering procedures have been probed to expedite and improve fat handling*. Better refining, clay bleaching, centrifugal clarification are contributing to make a whiter, blander product. And efficient new deodorizing techniques have been applied by many.**

Upshot is that today's high quality hydrogenated, deodorized lard is as bland and neutral in flavor as the best vegetable oil competitors. In performance it is about tops for deep fat frying but, while much improved, does not quite equal its vegetable counterpart in baking characteristics.

So here was the challenge—for despite all corrective measures and the best production technique, lard still remained a decidedly inferior shortening for baking a cake.

## Cake Baking Shortcomings

To understand lard's failings as a cake shortening it would help to briefly review fat structure and then compare the product with its more usable vegetable counterpart:

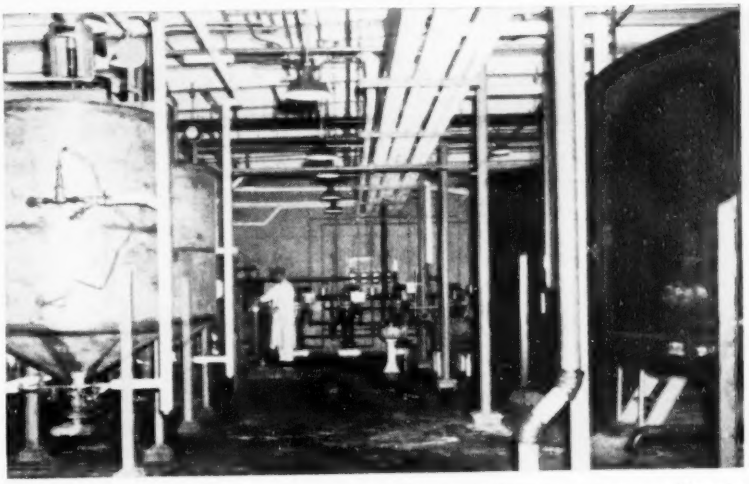
All fats consist basically of glycerine molecules, each of which are hooked-up with three fatty acid molecules. The acids involved can be of several types (oleic, stearic, and palmitic are most abundant), and these can be linked to the glycerine in various combinations. Hence, it is possible to have a fat composed of many different chemical compounds.

Many physical differences between fats are thus believed to be associated with the identity of these fatty acid constituents and their predominant arrangement on glycerine.

Actually, lard and hydrogenated vegetable oil are not too different in the kinds and proportions of fatty acids they contain. However, their physical disparity may be due in some measure to the way *their fatty acids are linked to glycerine.*

Ordinary lard crystallizes in large, coarse crystals that produce creaming and baking qualities inferior to those from the small, fine crystals native to hydrogenated vegetable shortening.

## It's a "Pipeline Process"



**EFFICIENT, COMPACT** new process occupies scant, single-level area at Kansas City plant. Twin vessels at left are reactors where catalyzed modification takes place.

One obvious way to alter the physical characteristic of lard is to change the identity of the fatty acids present. Actually, this is what happens in hydrogenation. To achieve a "harder" fat with a higher melting point, part of the liquid fatty acids hooked on to glycerine are changed to solid state by addition of hydrogen.

Other ways to alter lard character have been tried. An early explorer in this direction, the late A. E. Bailey, attempted as far back as 1940 to provide an esterification process that would influence lard crystalliza-

(Turn to page 100)

## New Lard vs. Vegetable-Oil Products

**ALL-PURPOSE SHORTENINGS:** Representative analysis of new shortening as compared with hydrogenated vegetable shortenings.

| | Rearranged Lard Shortening | Hydrog. Veg. Shortening A | Hydrog. Veg. Shortening B |
|---|---|---|---|
| FFA[1] | .04 | .04 | .03 |
| Color (Lovibond) | 10 Y, 1.1 R | 15 Y, 1.9 R | 8 Y, 1.2 R |
| W.M.P.[2], deM. C | 48.8 | 44.9 | 45.8 |
| Congeal, deg. C | 41.2 | 34.5 | 32.4 |
| Penetration 70 | 156 | 173 | 169 |
| Penetration 98 | 195 | 294 | 287 |
| Stability AOM [3] hr. | 91 | 75 | 90 |
| Flavor | 8.0 | 8.0 | 7.5 |
| Lb. cake volume | 274 | 260 | 254 |

**HIGH-ABSORPTION TYPE SHORTENINGS:** Added monoglycerides produce a high-absorption shortening that compares favorably with vegetable-oil counterparts.

| | Rearranged Lard Shortening | Hydrog. Veg. Shortening C | Hydrog. Veg. Shortening D |
|---|---|---|---|
| FFA[1] | 10 | .06 | .05 |
| Color (Lovibond) | 10 Y, 1.3 R | 15 Y, 1.5 R | 10 Y, 1.1 R |
| W.M.P.[2], deg C | 49.6 | 45.0 | 45.5 |
| Congeal, deg. C | 41.0 | 35.2 | 32.2 |
| Penetration 70 | 140 | 160 | 162 |
| Penetration 98 | 200 | 318 | 285 |
| Stability, AOM [3] hr | 91 | 77 | 102 |
| Flavor | 7.5 | 7.5 | 7.5 |
| Monoglycerides | 2.75 | 2.60 | 3.23 |
| Icing volume | 121 | 119 | 116 |
| Layer cake volume | 300 | 279 | 288 |

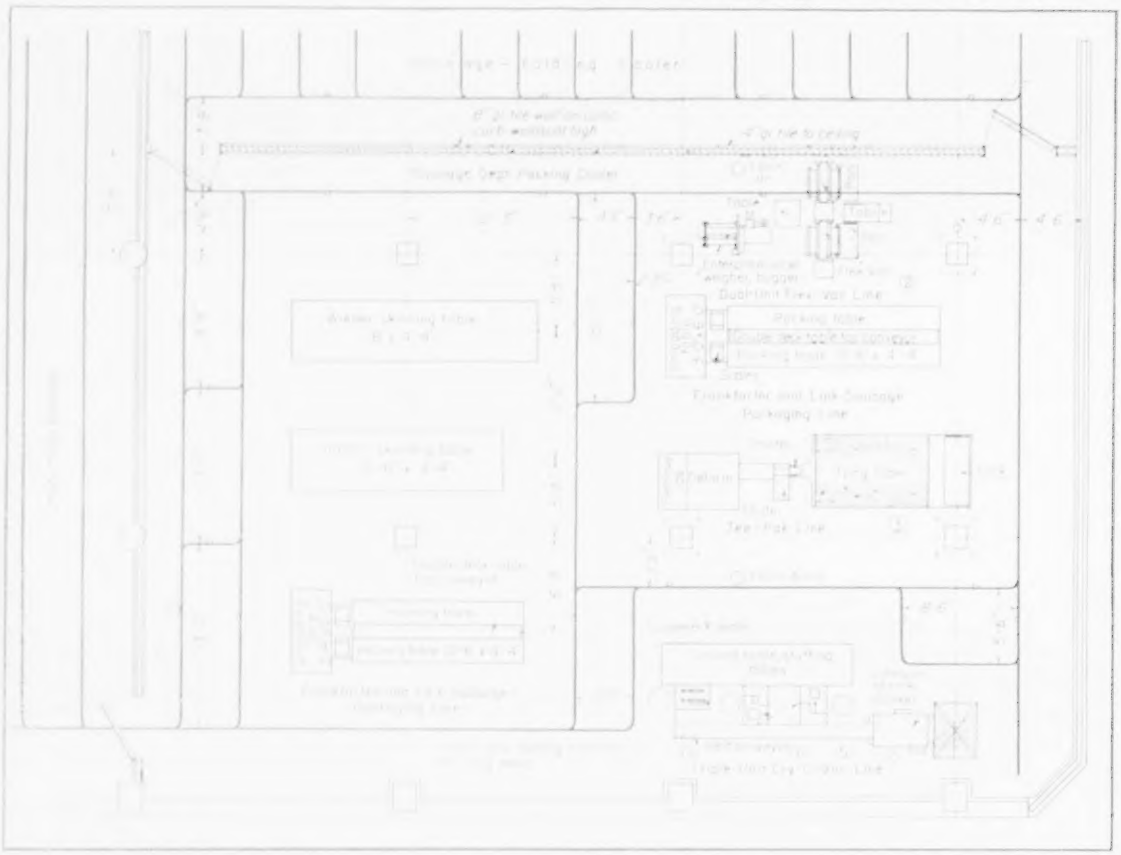
[1] Free fatty acid [2] Wiley Melting Point [3] Active Oxygen Method

*Note:* Above data reproduced from Quartermaster Food & Container Institute Symposium on Stability of Shortenings in Cereal & Baked Products, Jan. 16, 1953, courtesy Research & Development Assoc. Food & Container Institute, Chicago. Published as second in series, Surveys of Progress on Military Subsistence Problems.

* See "Revolutionizes Fat Rendering," FE Nov. '52, p. 72.

** See "Superior Animal Shortening," FE Aug. '51, p. 88.

## How Packaging Room Was Planned



**LAYOUT OF PACKAGING ROOM.** Centralized in this area are wiener-skinning tables as well as Tee-Pak, dual-unit Flex-Vac, triple-unit Cry-O-Vac, and frankfurter link sausage packaging lines. Circled numbers key with photos.

# Morrell *Integrates* Its Packaging

To bring unity to its freewheeling progress in prepackaging, this meat plant "took stock." Result: Special program set up to test new films and central packaging facility for speed, sanitation, and flexibility

**DON REEDQUIST**
Packaging Engineer, John Morrell & Co., Ottumwa, Iowa

After only a very few fast-moving years, in-plant prepackaging of sausage and smoked meats not only has arrived in force, but continues to keep the meat packer hopping with its fast-growing volume and diversity.

Here at Morrell, we had constantly been trying to stay on top of the situation. We examined new packaging machines and films almost on their inception. We shook up our lines, came up with new merchandising techniques, redesigned our packages.

But recently, in the midst of this super-activity, we abruptly stood still long enough to objectively look around. And what we saw indicated need for a complete and thoughtful study of the situation.

Specifically, what we viewed was a wide and uncorrelated variety of new machines and unique packaging stations tag-ending various processing operations throughout the plant. Just like Topsy, things seemed to have grown in frantic and almost indiscriminate fashion.

It was obvious that the time had come to integrate and unify these packaging operations into a centralized, orderly system.

Actually, our integration aimed at three targets:

- **Speed—with new lines setup for fast movement from process to shipping.**
- **Versatility—with multi-purpose flow eased by work simplification.**
- **Sanitation—with area design permitting rigorous clean-up techniques.**

One primary deterrent, however, almost stymied design and construction of the new central packaging layout.

A critical look at the diverse array of packaging equipment already on hand, and some broad peering at new units on the market convinced us

***Meat Special***

## And How Operations Are Carried Out

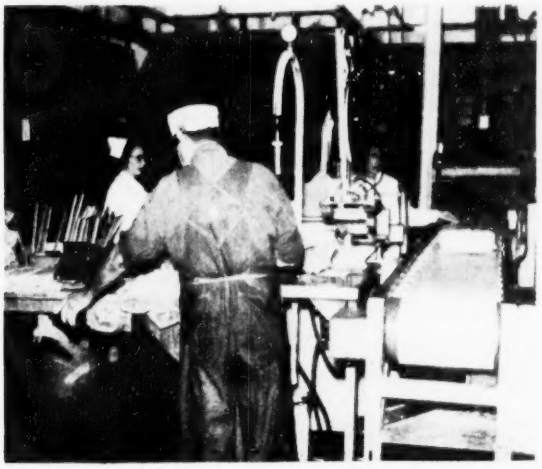
1 **CELLULOSE CASING** is stripped off frankfurters. Skinless wieners are then scaled into 12-oz. units and "cello"-wrapped.

2 **VACUUM** is pulled on bagged, sliced luncheon meats by Flex-Vac unit.

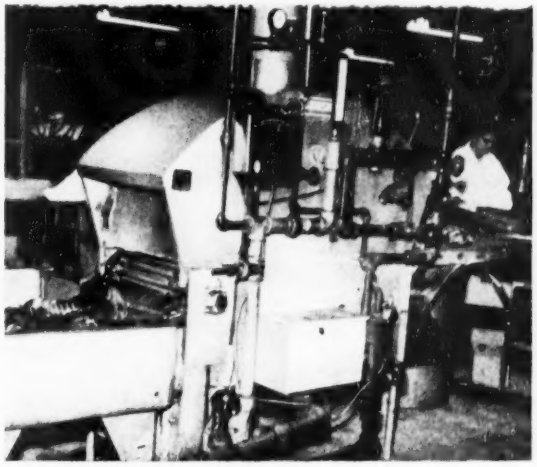
3 **MEAT LOAVES** are stuffed into casing on Tee-Pak line. Ends of casing are tied, and loaves then dipped.

4 **GOOSENECK UNIT** evacuates bagged meat loaf on Cry-O-Vac line. Shrinking of bag follows.

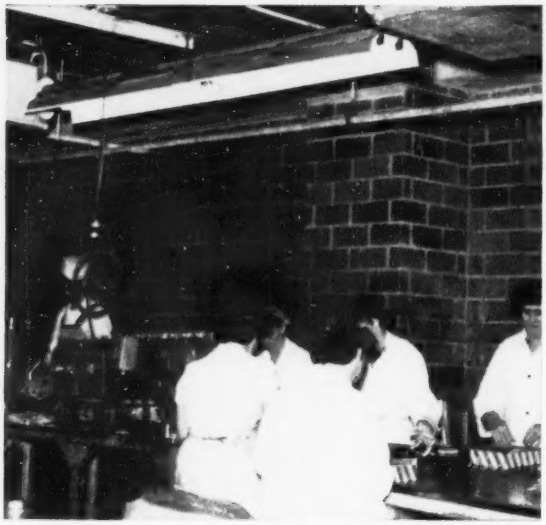
5 **HORIZONTAL UNIT** pulls vacuum from bag of smoked meat on same Cry-O-Vac line.



6 **VIEW** of Cry-O-Vac line. Products are stuffed into bags, which are evacuated and conveyed to shrinker.



7 **END OF LINE.** Bagged meats travel through this shrink-dunker to produce snug-fitting package.



**IN SEPARATE ROOM,** fresh pork sausages are packed. Left photo: Sausage meat is stuffed into 1-lb. cellophane bags. Right photo: Meat is stuffed into animal casings, which are then linked. Product is sealed and packed.

that a truly mechanized operation was really a few years off. Despite the best efforts of our industrial engineers in setting up new lines, it appeared that prepackaging techniques were still very much in a semi-automatic stage. So we were inclined to wait. For when you plan a new facility you aim for top efficiency right off.

But the major need for drastic clean-up settled the issue. The new packaging stations had created a peculiar enigma in the plant. Voluminous, hot-water washdowns were necessary, and these were almost prohibitive in an area normally full of product. A separate packaging area would solve this.

Hence, the new facility presents an optimistic compromise. It entails the utmost in sanitary design, including ceramic tile, fluorescent lighting, and air conditioning. But it necessarily utilizes rather high cost, semi-automated packaging lines.

However, by judicious planning our engineers have been able to gain maximum efficiency through multiple-use of these lines. And they have done the work with an eye toward complete mechanization in the future.

### Stock Taking

But before describing the layout and equipment in our new packaging set-up, let us consider some of the background factors that led to its inception.

First of all, when we "took stock" we found almost 90 different sausage items were being prepackaged, as well as a host of such products as luncheon meats, bacon, franks, and ham items. A variety of films—cellophane, Pliofilm, saran, Visten—were being used. And at least a dozen machines were involved in the packaging.

Consider, for example, the vacuum-packed lunch meats we pioneered back in 1950. Here, two Flex-Vac units were employed to handle 8-oz. portions of sliced meat in laminated cellophane-Pliofilm bags. Ten of our Morrell Pride meat loaf items were similarly packaged.

These Flex-Vac lines were set up in a partially tiled area convenient to the sausage cooler—but this was like putting a surgeons' operating theater in the middle of a steel mill.

Three Cry-O-Vac units were on hand to package our rings, whole loaves, and ham items. These also were scattered at the tail-end of the particular department that produced the item.

In addition, we employed various other semi-automatic packaging machines at scattered locales throughout the plant.

Naturally, this diverse location of packaging equipment precluded its flexible or multiple-purpose use. However, prior to the design of our new facility, time was taken to experiment with all equipment to explore its possibilities on new items.

Cry-O-Rap, for example, was tried on all uncut items. For while it is a relatively expensive way of wrapping meat, we have found that it very effectively extends the shipping distance on quality products. Thus, our full loaves will arrive on the West Coast after the five day haul in top shape.

However, a great deal of order in our packaging thinking became evident during this "stock-taking" phase.

For one thing, we had arrived at some pretty definite ideas about overwrap materials and these, of course, would determine much of the new layout. We then set up a special program for testing new films as they came out—actually running about 50 such investigations per year.

Using the current overwrap as a comparative base, we pack identical product in the test wrap, subject it to a program of time, temperature, and humidity, and compare for shelf-life and quality.

Hence, all different types of cellophane, saran, and Pliofilm are being tested yearly. However, we have ended up by using only three or four.

Essentially, our selection of film depends on the degree of air and product sanitation at the packaging site, the amount being packaged, and the distance of the haul—in addition, of course, to the protective functions desired.

### Far vs. Near

We have mentioned how Cry-O-Rap, a saran-base film, has proved very adaptable to far marketing. For local markets, we find it advantageous to use the relatively inexpensive Mil-O-Seal and Visten overwraps and casings. At the same time, we have found that a simple heat-sealed cellophane provides adequate protection for franks in shipment to either coast.

Saran has also proved a versatile and desirable film for many other products. Since it is a "non-breathing" material, we now use it as casing

(*Turn to page* 111)

## *Meat Special*

# Stops Fires Before They Start

Electronic hot-spot detector spearheads effective fire-prevention program in meat plant. Will amortize itself in 5 years or less due to lower insurance premiums

**FRANK De VAUX**
Chief Engineer, John J. Felin Co., Philadelphia

**CONSTANTLY SCANNING** smokehouse temperatures, this central electronic recorder actuates a signal light and alarm bell whenever heat in any house becomes critical. Record also serves as production control of batches.

Fire hazard areas—ovens, smoke-pits, boilers, etc.—are multifold in the average meat plant.

In fact, here at John J. Felin Co. a recent blaze in the No. 2 smokehouse not only destroyed a sizable batch of meat but also endangered products in all our houses by sending out a pulse of heat that unsettled automatic controls.

What's notable is that our quick control of this fire—entailing a costly police action—in turn crystallized efforts for a complete upgrading of our fire-control program.

**▶This has led to lower insurance premium rates by assuring—**

**A sharper vigilance, through an automatic temperature scanning network . . . surer prevention, through robot flame-failure shut-offs on all burners . . . improved defense, through complete renovation of fire doors . . . and direct action, through high-capacity water sprinklers in danger areas.**

Because the old saying about "an ounce of prevention" holds particularly true in fire control, let us focus on our techniques for stopping a blaze before, rather than after, it begins. Concerned essentially are electronic units, relatively simple to install which can be adopted, with little major planning by any meat packer.

First, however, a word about our smokehouses, since these constitute the locale of major improvement.

Three types of houses are employed to process Felin smoked meats. Seven older 6-floor pit-type units treat ham products. In these, manually ignited sawdust beds supply the smoke, and circulation is natural rather than forced. Our fire was in a house of this type.

Three of the remaining smokehouses are double-capacity units of the new single-level air-conditioned type with externally fired smoke generators and forced circulation. The other seven houses are reconverted two-floor pit-type units now only used as one-floor houses. These employ individual gas units, externally fired smoke generators, and forced circulation. The latter two types are used primarily for sausage products.

The ham houses, supplied with steam heating and humidifying coils, are controlled by wet-and-dry bulb thermometers. The reconverted sausage houses have steam heating and humidifying coils and are controlled by simple on-off type MH regulators on the individual gas units.

The air-conditioned houses are supplied not only with steam and humidifying coils but also rinsing or cold-water sprays. This type house has automatic dampering controls for smoke, as well as two-pen indicating, controlling, and recording instruments with control point setting for any time period. Regulated combustion of sawdust and spark-trapping devices in the circulating system make fire control of the air-conditioned and reconverted units a problem completely different from that of the pit house.

## Scanner Adapted

Since circulation is natural, dangerous sparks are often borne into this area with the smoke. Of course, conditions are rarely just right to create a fire.

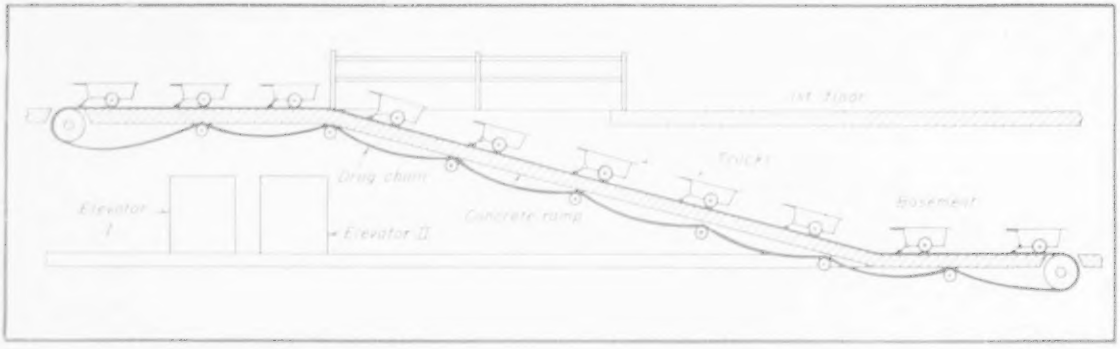
Complicating the picture is the fact that heat is also supplied to the house, with temperature often near 170 deg. F. for as long as 10 hr. Yet, if one is to detect a budding fire, an advance warning must be given of any rise well under 200 deg. F.

To solve this we adopted a precision temperature scanner like the 12-point unit in our engine room for checking efficiency of our refrigeration system. This consists of a six-record strip-chart Brown electronic potentiometer with 0-to-200 deg. F. range of temperature.

Guaranteed accuracy of this unit in

(*Turn to page* 111)

## 1—Relieving Freight-Elevator Delays




### Present Status

A survey of daily performance by two elevators revealed that 299 loads were carried up to various floors in the 8-story plant and 192 were taken down, total 491. More than half of the up-going hauls (174) were from basement to first floor. And more than one-third of all up-and-down movements were between basement and 1st floor.

### What Might be Done

Construction of a sloping (10 deg.) 10x80-ft. concrete ramp with continuous drag chain and hooks spaced 10 ft. apart could serve as the carrier between basement and first floor. Elevators would then be free to handle the remaining in-plant up-and-down hauls.

Manual handling would be eliminated, inasmuch as the drag chain would pick up truckloads from basement and deposit them on the first floor. Chain pull design calls for a 5,000-lb. maximum.

**Cost of Improvement**

| | |
|---|---|
| Ramp @ $2 per sq. ft. | $1,600 |
| Drag chain | $3,000 |
| Total | $4,600 |

**Annual Labor Savings**

| | |
|---|---|
| 174 loads a day (18 man-hours per day) | $6,750 |
| Time saved waiting for elevator by eliminating one-third of loads | $6,750 |
| Total | $13,500 |

# *Never Too Old* to Modernize

## 4 Ways That Up Output, Save $$$ on Operations

Outmoded plant's performance can be streamlined by efficient use of space and selection of right handling units. Here's a survey showing how great strides can be attained in a multi-story plant—and with little investment

**PRESEN JESSEN**
Presen Jessen Co., New York City

You get highest efficiency in operating a meat-packing plant by producing a steady flow of quality goods at minimum unit costs—not through serving as a warehouse for inventory manipulations.

As for space, most plants constructed before the war were of the multi-story type, with ample floor area, and excessive cooler capacity. And it's a good thing to have a lot of space—if you want to store materials. But not if you want to process them into finished products.

Reducing in-process inventories to 50 percent by doubling turn-over rates from, say, once every four days to once every two days or less, will free enough space to double production.

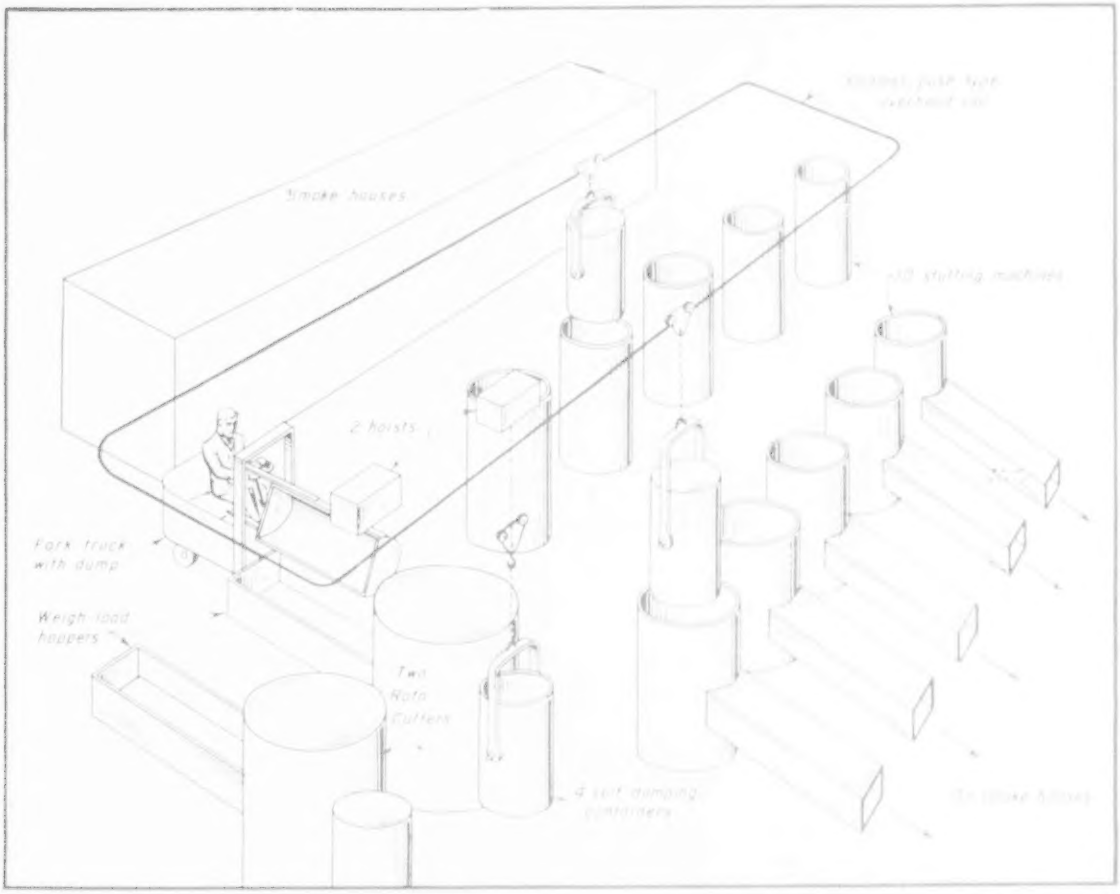
Compacting operations on a single floor, instead of having them spread out among five or more floors, will save on materials handling, speed processing, and improve working conditions.

A survey of existing operations in an old plant can prove profitable. Space can be more efficiently used, and advanced processing equipment can be purchased for more efficient operations and handling of materials.

We present here a typical check of an old eight-story meat-packing plant in the Midwest, together with four suggestions for improving operations without making excessive investments. In fact, cost of these improvements are calculated to be significantly less than the annual savings. A good half of the improvements would pay for themselves within six months, the remainder within a year.

You'll see here what can be accomplished in effecting operating savings by mechanized handling.

# 2—Mechanizing Sausage Operations




## Present Status

Sausage operations are now spread over five floors, with seven full-time truckers needed to haul trimmings and sausage meats between floors. Trimmings are trucked, via elevators, from 3rd and 4th-floor cooler storage to Roto Cutters, one of which is on the 2nd floor and the other in the basement. They are hand-shoveled into weigh-load hoppers feeding cutters.

From cutters, truckers then haul sausage meat, via elevators, to stuffers located on the 2nd and 5th floors. Here, meat is shoveled into stuffers.

With this system, considerable time is lost waiting for the two elevators and in the hand-shoveling of trimmings and sausage meat.

## What Might be Done

By confining sausage operations to the 2nd floor and loading cutters and stuffers mechanically instead of by hand, elevators would no longer be required. Only three truckers would be needed to load cutters and stuffers.

What's more, the proposed system would reduce transport distances at least 80 per cent. Thus, output would be increased about 30 percent. And with use of but 19, instead of 23, production workers, unit labor costs would be slashed about 30 percent.

By providing an additional 2,300 sq. ft. of space on the 2nd floor for sausage operations, all hauls by the two elevators would be eliminated. Only exception would be moving the finished products to the 5th-floor sausage-packaging department. With this arrangement, the number of truckers would be reduced from seven to three.

Mechanical loading of Roto Cutters is "set up" by two simple steps: (1) transferring the basement Roto Cutter to a position adjacent to the present machine on the 2nd floor, and (2) buying a fork truck.

The lift truck must be provided with a turn device to facilitate dumping of truckloads of trimmings into the weigh-load attachments feeding the cutters. Tub of the truckload of trimmings, rather than the entire tank truck of meats, should be up-ended. This means that the tank truck must be modified so that the tub can be lifted off the truck, and yet carried by the truck in the usual manner.

Mechanized loading of the ten stuffing machines can be accomplished by gravity-loading sausage meats from cutters into six cylindrical buckets. Loaded buckets would then be raised by hoists to an endless, push-type, overhead monorail directly over the stuffers. Buckets would be pivoted to a yoke carrier so that they can be up-ended for loading the stuffers. Each bucket must be provided with a dipper-like spoon to provide a vent to dump.

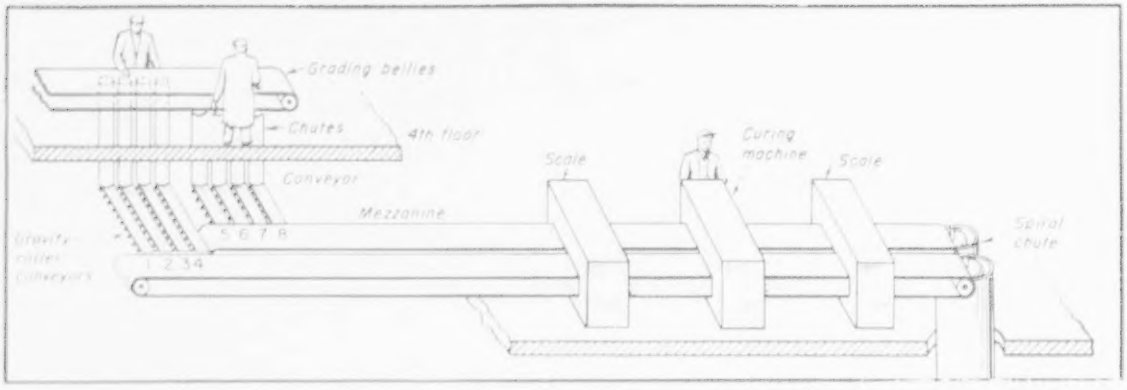
The new system of mechanically loading trimming into cutters and sausage meat into stuffers should eliminate two men.

**Cost of improvement**

Relocation of equipment, installing of overhead rails, purchasing of fork truck, and providing buckets ..... $15,000

**Annual Labor Savings** ... $24,000

# 3—Speeding Bellies Through Cure




## Present Status

Truckloads of bellies are now pushed by a worker from grading area to temporary storage. Labor: 4 man-hours a day.

From temporary storage, two workers transport trucks over a scale to curing, then from curing over another scale to curing storage, and then from curing storage to elevators. About 80 percent of the cured bellies go to smoking, remainder to shipping.

Three additional workers unload bellies from truck onto curing conveyor, then from curing belt into truck. One of the workers adjusts curing injection for the different grades of bellies. Heading the curing personnel—a total of seven—is the supervisor.

## What Might be Done

Five workers can be eliminated under a proposed system whereby two graders drop bellies into eight short chutes (four for each grader) that deliver them to a similar number of booster-type belt conveyors on the floor below. In turn, these belts would deposit bellies onto gravity-roller conveyors. Bellies would then be discharged—in lots of 30 to 50—from each of the gravity-roller conveyors onto one of two belts that would carry them over a scale to a curing machine.

Feed of bellies on each stretch of gravity-roller conveyor would be past a gate opened electrically by operating a pushbutton at the curing machine.

Curing injection need only be adjusted for each lot of bellies consisting of a single grade. Speed of the belts carrying bellies to curing machines would be adjustable.

From curing machine on each belt, bellies would be conveyed over a second recording scale to go by spiral route to the curing floor.

This method requires only one man to operate the two curing machines and empty the eight roller conveyors as they fill up. Moreover, the four man-hours required by the present method to truck the bellies from grading to storage could, in the proposed method, be employed to truck cured bellies away from the spiral chute.

**Cost of Improvements**
Chutes and conveyors.....$16,000
**Annual Labor Savings**....$20,000

# 4—Loading of Cased Goods

## Present Status

Power and hand-lift trucks are now used for hauling skidloads of cased goods into trailers. Two men then hand-pile cases from skids and into trailer. Cost of loading a trailer is $12. And 8 to 12 man-hours are required.

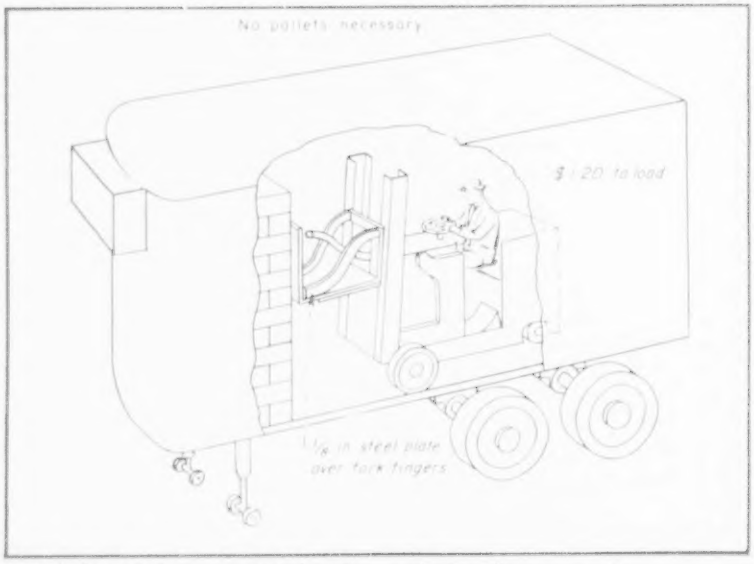
## What Might be Done

Adoption of a mechanical loading system would enable one worker to load in 1 hr., cost of $1.20.

Needed is a 3,000-lb. capacity fork-lift truck with push-off and side-shifter attachments. It is not suggested that pallets be used, since greater loads (15 to 20 percent) can be put into trailers without them.

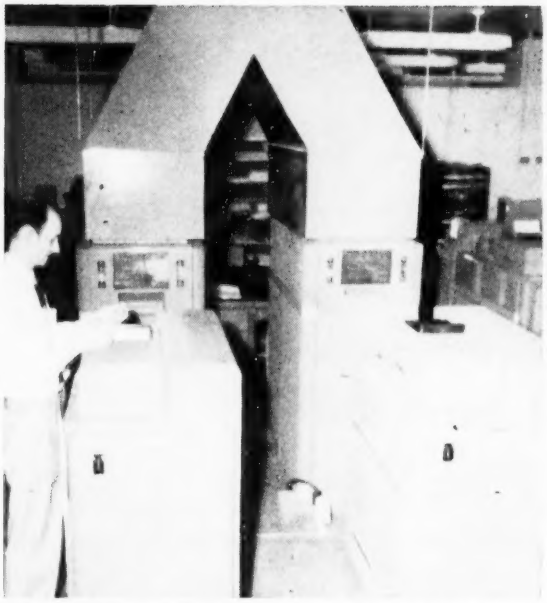
Instead of pallets, specially designed, yet inexpensive, skids can be built. They would consist of 2x2x4-in. blocks, nailed on the top four corners, with ¼-in. steel plate over blocks.

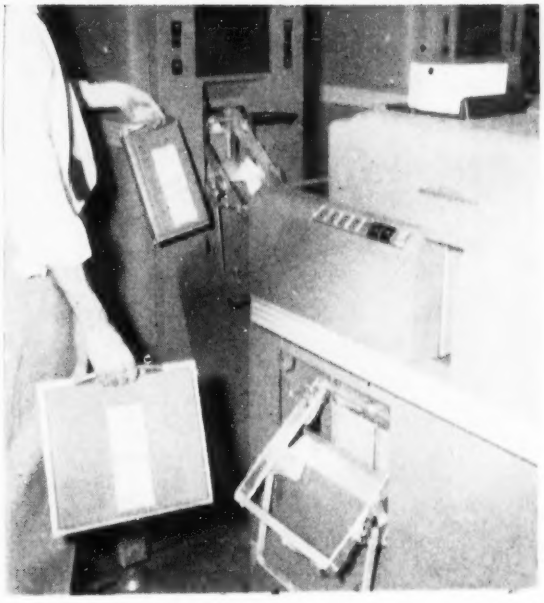
Cases would then be loaded onto the steel plate. The entire load—skid, plate, and cased goods—would then be hauled by fork-lift truck to the trailer.




And fork-truck fingers would then be inserted between skid and plate to lift the plate-load into the trailer.

**Cost of Improvement**
Fork truck (attachments).. $3,500
**Annual Labor Savings**.... $16,000





**CEREBRUM** of mechanized accounting is this high-speed digital calculating and punching machine. It can read and compute 60 problems at a fraction of a second per card. Pre-wired plugboards (seen right) dictate procedure.

# Cudahy *Accounts Electronically*

## It Takes Only 60 Sec. for Multi-Operation Units to

## ★ Punch 110 Cards . . . ★ Sort 650 . . . ★ Collate 400

Packer today is whisking out intricate orders, invoices, labels, tables, and summaries on advanced mechanical bookkeeping units . . . Super machines promise to play vital role in "nerve-centering" food plants of tomorrow

**AS TOLD TO FE BY OFFICIALS OF CUDAHY PACKING CO., OMAHA, NEB.**

When an accounting-minded visitor starts to realize the intricacies of large-scale meat packing he is astounded that it ever manages to stay out of the red.

He beholds literally hundreds of distinctive products—in all shapes and sizes—being routed to thousands of customers in almost as many communities. He is staggered by prospect of the bookkeeping, paperwork, statistics probably needed to make sense out of this colossal activity and nervously doubts that any such control really is exerted.

And he is completely flabbergasted when it further dawns on him that this is a topsy-turvy field where control must extend from the whole to its parts—from carcass to cuts. It appears that the meat packer cannot make a profit; rather, must save it.

Reasonable scrutiny, however, reveals that an amazing order and clarity does prevail in packinghouse bookkeeping despite this complexity. Also that volume meat packing actually is a going business because of the remarkable service and distribution system that has evolved over the years.

But the initial reaction of the visitor serves to dramatize an acute problem: *Not only has accounting been expensive, but its growing complexity has made it more and more difficult for management to make decisions based on an assessment of business trends.*

Fact is that while an executive brain could store and deal with all relevant information in the old days, current dynamics take this ability beyond the scope of a whole crew of top thinkers.

And also, meat packers are turning to mechanized accounting for the answer. Since World War II, many companies have gone to punch-card data processing, which can serve up, at unbelievable speed, pertinent facts and figures for management decisions, as well as deal with the complex routine of general and distribution accounting.

### Present and Projected

Here at The Cudahy Packing Co., Omaha, we have a general feeling that our present has been revitalized and our future will be greatly influenced by our recently installed system of 27 International Business Machine units. Already—in the few short months of operation—new vistas have opened in operating control.

Actually, our immediate reasons for going to this equipment were well

***Meat Special***

# *At last* a cleaning process that cleans steel drums completely...

## • removes contaminating materials
## • inhibits rust and corrosion
## • provides an ideal surface for finishes

• United States Steel Products, maker of quality drums and pails, now offers you something extra in steel drum construction. We have perfected a cleaning and finishing process which not only clears the drums of mill scale and other contaminating materials, but also retards rust and corrosion, and provides an ideal surface for coating.

The process consists of (1) cleaning the drum parts *completely*, (2) removing mill scale, and (3) applying a phosphate treatment to the steel surface, which results in a phosphate coating combining with the steel surface . . . which inhibits rust and corrosion, aids adherence of paint to the surface.

The new U. S. Steel Products process takes place *after* the parts have been formed—just prior to final assembly of the component parts; there is no flaking problem. As a result, you get drums that are completely free from contamination.

For the protection of the products you package, and for longer lasting drums, be sure to get drums *protected* by the United States Steel Products process the next time you order steel drums.

United States Steel Products fabricates Stainless, Galvanized, Tinned, Painted and Decorated drums and pails. Furnished in capacities from 2½ to 110 gallons, with a variety of fittings and openings to fit your particular requirements.

**WHEN THE INTERIOR** of an ordinary drum is wiped with a handkerchief (below), the handkerchief will pick up grease, dirt, scale and rust.

**PHOTOGRAPH ABOVE** shows the cleanliness of the new U·S·S drum . . . the handkerchief remains absolutely clean!

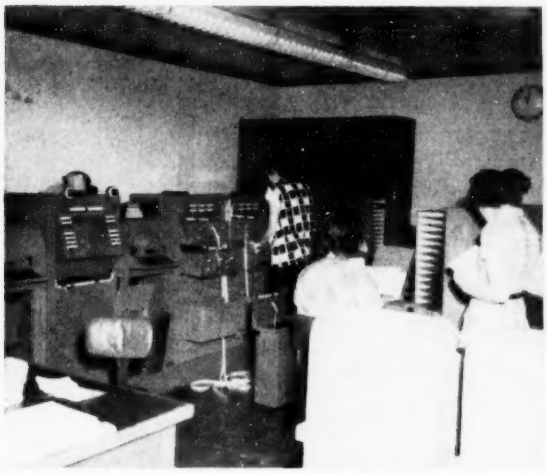
*"It's Better to Ship in Steel"*

**UNITED STATES STEEL PRODUCTS**
**DIVISION**
**UNITED STATES STEEL CORPORATION**
30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.
*Los Angeles and Alameda, Calif. · Port Arthur, Texas · Chicago, Ill. · New Orleans, La. · Sharon, Pa.*

USS

**UNITED STATES STEEL**

## Calls for Shipments Pulse Into Omaha "Nerve Center"...



1 **INCOMING ORDERS** funnel via teletype into fast-action communications room at Omaha.

2 **TAPED AND TYPED** messages are next pneumatically tubed to the special tabulating room.

proven elsewhere. We wanted to speed up and improve our distribution with a mechanized order-and-billing system. This has already paid off in a surge of customer comments lauding its new speed, accuracy, and legibility.

Naturally, our sales people are also delighted. As they put it, "We now have superior invoicing methods to match our equally superior products."

Our projected reasons for adopting this equipment, however, may reach much further in significance.

The handwriting seems to be on the wall—meat packing faces a rigorous period of modernization and self-improvement to attain a really healthy economy. And we think of our extensive use of mechanized accounting as Phase 1 in such a program.

Look at it this way: A meat processing operation is like a large, ponderous organism. Plant facilities are its body; equipment its organs or working parts; employees and management its brains. In this analogy, communications can thus be called its nervous system.

When a man unconsciously lights a cigarette he may burn his fingers unless his responsive nerves transmit the message that causes him to shake out the hot flame. Similarly, a meat plant must move, and move quickly, to stay healthily abreast of market conditions. Being "burned" by sluggishness has been a common ailment in the business.

Hence, we envision better communication through mechanized tabulating and accounting procedures as a sort of "nervous system" which is required before full modernization can occur. With this budding system already established, we expect to achieve a maximum from new processes and facilities as they are installed.

To those who may question our emphasis, let us say that it is not a question of "putting the cart before the horse" or vice versa—it is a matter of having the proper traces on hand to join the two together.

### Punch-Card Processing

Before describing present operations, it might help define the scope of our I.B.M. equipment:

First, there is the basic tool and symbol of the operation—the cardboard form that ultimately contains punched information. This is 8x3 in. in size, imprinted into columns where number or alphabet designating positioned holes are punched.

Data is recorded initially on these cards by a keyboard punch, similar to a typing operation. Blank cards can then be grouped together under this "master card" and gang-punched by a machine to add this data to all. Several sets of information can thus be mechanically assembled on a single card or groups of cards in any combination as desired.

Because this gang-punching of cards from master units can create a bulky jumble of stacked information, some very necessary machines are on hand to sort and collate. These can regroup punched cards from an unclassified stack into any desired form, such as product type or areas of shipment.

Actual machine "reading" of the cards takes place by electrical contact through the positioned holes. A plugboard-type wire circuit in the machine then converts these signals—through electrical relays—into a desired mechanical action, such as the movement of sorting gates or the actuation of printing bars. The latter, of course, will translate the punch-pattern into normal readable information.

Since a great deal of gang punching, sorting, collating, etc., seems to go into the processing of a given set of information, couldn't the full assembly of punched information be done faster by hand?

The answer is no, since the speed at which these machines perform soundly refutes the thought. For example, gang punching handles 100 cards a minute; 650 can be sorted per minute; around 400 can be collated per minute.

When a desired set of information has been punch-assembled in a group of cards, these are then run through the accounting machine. This will, according to its temporarily installed plugboard circuit, reel off at high speed beautifully printed orders, invoices, labels, tables, summaries, etc. —in fact, practically anything in the whole gamut of bookkeeping forms so necessary to business.

### "Mechanical Brains"

Although the accounting machine is capable of a modest amount of summarizing and cross-adding of figures, more complex totalizing and mathematical interpretation of card-borne data is handled by the electronic calculating punch.

Essentially, the calculating punch is a high-speed digital computer similar in principle to the complex "me-

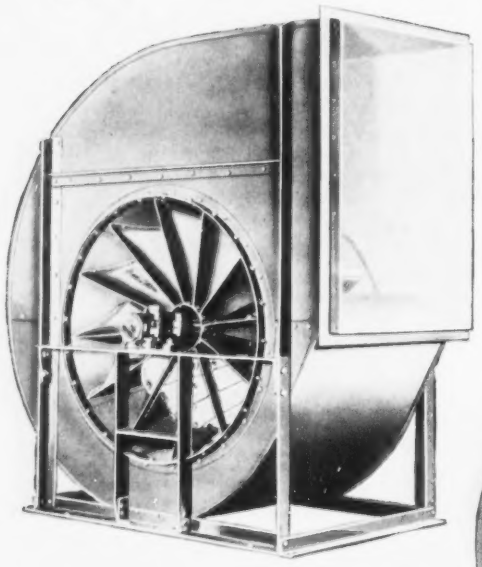
(Text continues p. 86)

**Meat Special**

# WHAT'S THE LIFE EXPECTANCY of a FAN?

Will the fan you buy be operating 10, 20, 30 or more years from now? That depends on many variables—type of service, severity of conditions, the fan's construction, how well it is maintained, etc.

There is a reliable yardstick by which you can judge—past performance. For instance, there are "Buffalo" Centrifugal Fans on regular duty today that were installed in 1895 . . . 58 years. Other "Buffalo" Fans, on forced and inducted draft, the toughest job you can name, were installed over 26 years ago. Certainly, the "Buffalo" record of long life and freedom from troubles in thousands of installations is a yardstick of the performance you can expect from a "Buffalo" Fan.



**"BUFFALO" LIMIT-LOAD FANS**

. . . are the famous non-overloading air-movers used in many of the country's largest systems today. "Buffalo" manufactures a full line of centrifugal fans for nearly every blowing and exhausting application in industry today. Write for details on *your* air job—today.

**"BUFFALO" AXIAL FLOW FANS**

. . . are compact, lightweight fans for duct-mounted ventilation, exhaust or air conditioning service. Straight-line air delivery plus freedom from air turbulence make these fans highly efficient.

Write for Bulletin 3533.

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VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING
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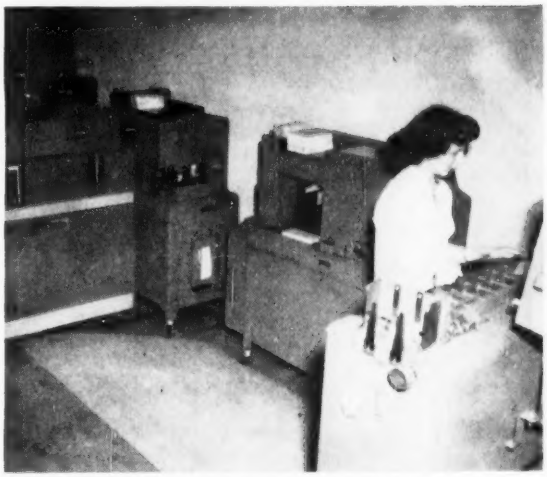
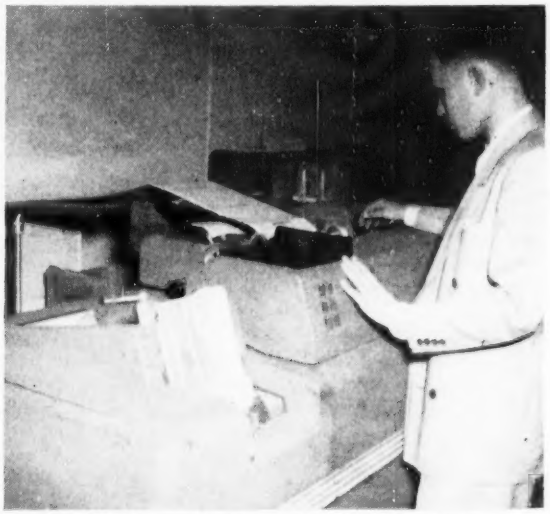
## . . . Then Orders Zip Through Punching, Labeling, Billing

**3** **INFORMATION** is automatically converted by these units from tape into punches on cards.



**4** **CARDS** are now "ganged" with masters, then sorted, (above), collated, and interpreted.

**5** **PUNCHED ORDERS** are next grouped to facilitate handling of unit shipments in boxes and cars.



**6** **TABULATOR** prints four copies of orders, later labels, at rate of 150 lines per minute.

**7** **PRINTED LABELS** get large numbers that expedite operations at the packing station.

**8** **PNUEMATIC TUBE** speeds the orders and labels to the plant for "on-the-dot" handling.

**9** **AFTER SHIPMENT,** calculator extends for money due and the invoices are printed.

dling cards, assessing their information, and performing a desired computation. Results are simultaneously punched into the cards for later translation into print by the accounting machine.

While a mathematician with a desk calculator could perhaps process a handfull of such cards per hour, this unit, with its electronic tubes, handles 6,000 cards per hour and can perform up to 60 operating steps for each card.

The calculator consists of three parts: A storage or memory bank to hold information for future use; an arithmetical computing system that can multiply, divide, add, and subtract in any combination; an insert plugboard that dictates how the calculation proceeds.

What the calculator performs depends upon the pre-wired plugboards which are inserted into its punch unit and separate electronic computer cabinet. As new problems arise in assessing operating data, plugboards can be designed to cope with them. Hence, we are building up a whole storage bank of these pre-wired panels. These panels have already involved the calculator in a variety of tasks.

While routine mechanized bookkeeping, such as extending for money due in invoicing, is daily "duck soup" for the calculator, some interesting analytical tasks have also become customary for this machine. For example, the costs for each product are stored in the unit and then cards are run through detailing sale price and quantity over a certain period. The resulting calculation and summarization immediately spotlights where we are making and losing money.

Similar computations can be made of departmental costs on a comparative basis, extending right into field operations where sales-analysis reports offer the salesman a check on his efficiency.

With succinct, very current reports of the above type coming to management on a daily routine basis, it is easy to see why our executives enthuse about the "new ability to move."

### Freewheeling Distribution

Let us now consider the operating routine of our I.B.M. system as it fits into the basic distribution pattern.

Actually, the new system starts in the field with the salesman's orders. These are collected for transmission to the packinghouse from all over the country. Our system then permits shipment from the plant normally on the day following the salesman's contact, and a good percent of rush orders are shipped on the date of sale.

To expedite communications, teletype centers have been set up in key cities. These transmit the mailed, 'phoned, or telegraphed orders received from area salesmen. Thus, centers in Boston, Washington, and St. Louis are directly hooked to the Omaha plant. Detroit is linked to Sioux City, and Memphis to our Wichita packinghouse.

Each product carries a three-letter code that is used by the salesman in writing up his orders. For instance, a piece of Puritan ready-to-eat shortshank ham, 18 to 20 lb. average, is placed in the order blank as *KKJ*; a side of U. S. choice veal No. 60, 130 to 160 lb. average, boils down to a simple *BXA*.

Another three-letter code, always beginning with "*E*", is used to include any special instruction or specifications made by the customer. For example, "light end of average" is indicated by *ELB*, etc.

Of course, the order as it is sent in by teletype also contains information which gives the name and address of the customer, his route number, the coded list of products, and the quantity and price of each item.

All communications from area teletype centers—including copies of those going to Sioux City and Wichita—funnel into our "penthouse" message center atop the new office building in Omaha.

The incoming orders appear in two forms—as the actual printed message in duplicate, and as the punched teletype tape. Both of these are immediately sent down to the tab center, three floors below, via pneumatic tube.

### Tape to Card

First, the tabulating department separates the orders according to route, date sold, date to be shipped, and load number, until the shipments are in small workable groups. Then the teletype tape itself is put through a special key punch that automatically transmits its information onto a series of punched product cards.

A rather new technique, this automatic tape-to-card system minimizes handling and eliminates human chances for error by making out the important product cards mechanically.

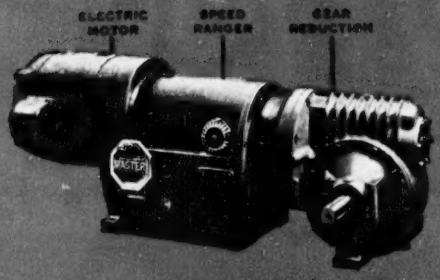
Next the customer name-and-address cards are pulled from a "hold" file according to route and number and placed with the product cards. The gang punch then places this information, plus date sold and shipping date, on all cards. Sorting follows and the cards are grouped according to products as listed by 3-letter code.

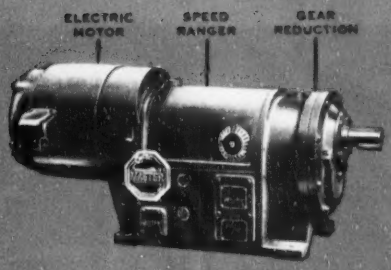
After sorting, the collating machine —generally considered as the "tabulating file clerk"—matches the product cards with a master product deck which has punched descriptions of each coded product. This information is then gang-punched into each of the cards, which are later used for calculating and printing.

The interpreter, a relative "slowpoke" at 60 cards per minute, now is used to translate punched data in each card into printed information in special spaces at its top. These interpreted detail cards are then filed behind the name cards on the collator.

Cards bunched together in final order go to the order-writing department, where a clerk, specialized in pre-packaging, checks each individual shipment to determine how many different items can be packed in one box. This information is punched by hand and insures that labels will be run that show exact products in each

**ACCURACY** of mechanized system is periodically assured by these key verifying machines that compare the card punches with the actual printed data.

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See how the designer of this tobacco processing machine has used two different Master units that are just right for his purpose . . . one, a motor with a variable speed unit and a right angle worm gear, the other a motor with a variable speed unit and a parallel shaft gear reduction unit.

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Select the RIGHT power drive from Master's broad line and you can increase the saleability of your motor-driven products . . . improve the economy and productivity of your plant equipment. That's the horsesense way to use horsepower.

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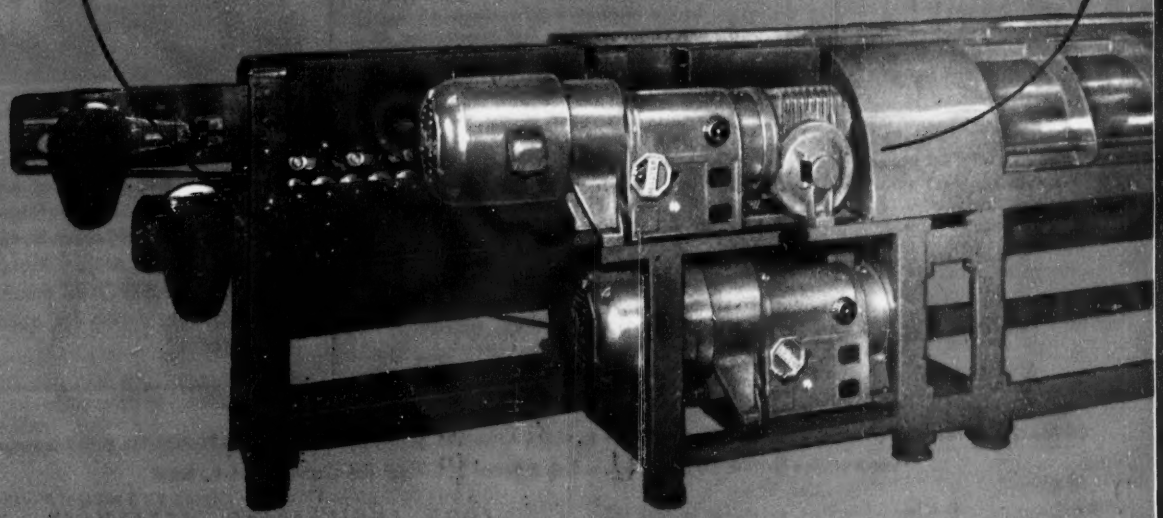
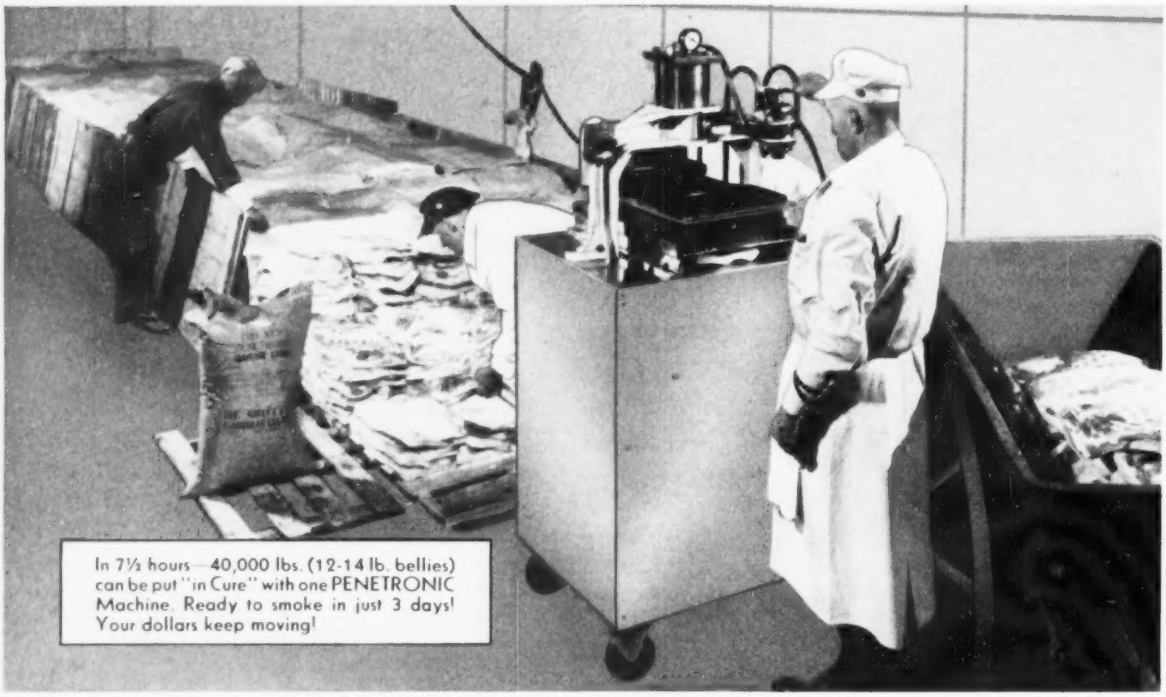


# How to "Dry Cure" Bacon for Quicker Cash Turnover!


In 7½ hours—40,000 lbs. (12-14 lb. bellies) can be put "in Cure" with one PENETRONIC Machine. Ready to smoke in just 3 days! Your dollars keep moving!

## *NEW PROCESS CUTS COSTS BY "DRY CURING" BACON OF HIGHER UNIFORM QUALITY IN JUST 3 DAYS!*

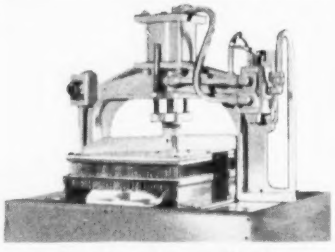
**PENETRONIC** TRADE MARK REG.

PROCESSING MACHINE and "DRY CURE" BACON MIX–

Already, 66 packers are enjoying the advantages that PENETRONIC offers you: It eliminates old-style curing boxes—and soggy, brine-soaked bellies. Reduces labor costs. Speeds inventory turnover—"*dry-cures*" in just 3 days. And constantly produces bacon of *exceptional* uniformity!

The secret is *fast penetration* of PENETRONIC Bacon Mix. It results in uniform salt content...firm fat... long-fixed, bright pink lean meat... and long stability of the sweet, mild flavor.

Check into the advantages of better, quicker curing with Griffith's PENETRONIC Process. *Be No. 67!* Write or phone today for details.



**Profitable PLUS Applications of PENETRONIC Process**

Cure Beef for Drying in just 4½ days...Corned Beef in 4 to 5 days...Dry-Cured Boneless Hams in 5 days...Plates in 3 days. PENETRONIC means quick, quality curing for quick cash profits.

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box shipped. Thus the customer can immediately store unopened boxes on receipt and not worry about contents.

### Punches to Print

With data all assembled, cards now pass through the tabulator, which prints the order—including exactly what is ordered, quantities, and prices—at 150 lines a minute. Four copies at a time are printed in continuous fashion, each invoice being separated by a perforation in the paper.

By changing a plugboard, the same grouping of cards is again run through the printer to produce the labels. Run in triplicate, these contain name and address of customer, route number, loading sequence number, truck line name, products ordered, and any special instructions. As they are printed, each label has a consecutive number for control and a final total at the end of the run.

While the labels are being run, the orders are put through the burster. This mechanically cuts off the edging, separates the orders at the perforation, and puts all original or first copies in one group. Carbons are placed in other groups of second, third, and fourth copies.

When the labels are printed, they are also stamped with a large red number that indicates the order in which shipments are to be packed in the plant and insures easy sorting of products for loading. This is done mechanically by a Moore label numberer.

Labels along with a copy of the order are sent by pneumatic tube to the plant for handling. First copy of the order, however, stays in the tab department as a record, while the remaining copies go to the sales division and to the credit department for processing.

*In an average routine, approximately 1 hr. has now elapsed from the time of receipt of order in our message center to delivery of printed order and label to plant.*

As the orders are packed—usually during the night following receipt of the order—the shipping clerk notes the exact weight on catch-weight items, such as loins and hams, as well as any substitutions or changes. Original label is torn off and piped back to the tabulating department with this information.

Then the third label is glued to the carton which goes (with second label also attached) to the loading dock for assembly according to loading number. Here, the second label is removed as product is placed in the truck or railroad car, and is later matched in the dock office with the dock copy of the order.

If there are any discrepancies in the shipments, tabulating is immediately called to make any necessary changes in its billing and invoicing. The third label remains on the box as a shipping tag.

After actual shipping is accomplished and each department has returned labels with exact weights enscribed, tabulating can proceed with the billing.

First the labels are sorted by hand according to load number and matched with the product cards, which were previously sorted and filed for this purpose. This matching provides a final check to be certain that orders have been filled as stated. Then a Comptometer operator figures the gross and net weights of the catch-weight items and enters this information on the top tag of each group. This data is entered on the card by a key punch and checked by a verifier.

The electronic calculator now takes over the job of extending the fixed-weight items, putting in the gross and net weights, at the same time ignoring the catch-weight items that were entered on the key punch. It then proceeds to extend for the money due on each product, taking quantity times price; the number of pieces times price; or the unit weight times price, according to the type of product involved.

Another run through the machine verifies the foregoing. Also, the calculator checks accumulated weights for each item to determine if they are within reasonable range.

Believe it or not, all this tedious calculating procedure is handled by this versatile machine at the rate of about ten complete invoices per minute.

After a collating operation to match detail and name cards, the invoices are run on the printer. The machine makes four complete copies of each invoice as well as four copies of the delivery receipts on full cars, or bill of lading on less than car loads.

When the invoice leaves the printer it is passed through the burster, into window mailing envelopes for the original and the salesman's copy, with the remaining copies going to the claim department and tabulating files.

**Contrast these uniform and clearly printed invoices with former methods: The old invoices came to the customers with a variety of writing—everything from typed information to pencilled figures inserted by Comptometer operators and billers—plus the initials of four to six persons who checked various steps in preparation.**

As can be seen from the time factors quoted above, today's method not only helps the customer in his bookkeeping, but also increases speed and efficiency all along the line. And the records and reports possible from the master information used in preparing each invoice is proving a bonanza to our management.

### Reports Follow

Simultaneously with the invoice run, the calculator cuts a single card that includes the total of each invoice, the route and customer number, and a breakdown of weights. These cards are used to compile a customer analysis report, which is of great value to the sales department.

Also, the same totalizing cards are reproduced in the gang punch for the accounts receivable records, which have long been part of our tabulating procedure.

After all the above steps are completed, the detail or product lines are separated out to make up shipping reports that include the total shipped of each item as well as prices and sales values. These reports are used for stock records, price checks, and for several other analyses.

Figuring in the compilation of all these reports, of course, is the electronic calculator with its remarkable ability for data condensation and analysis. This unit is slowly taking on "working sinews" in operational as well as distribution accounting.

For example, payroll has been adapted to the new punch-card system, with the calculator used to punch and verify such items as gross and net pay, including taxes and various deductions for each employee.

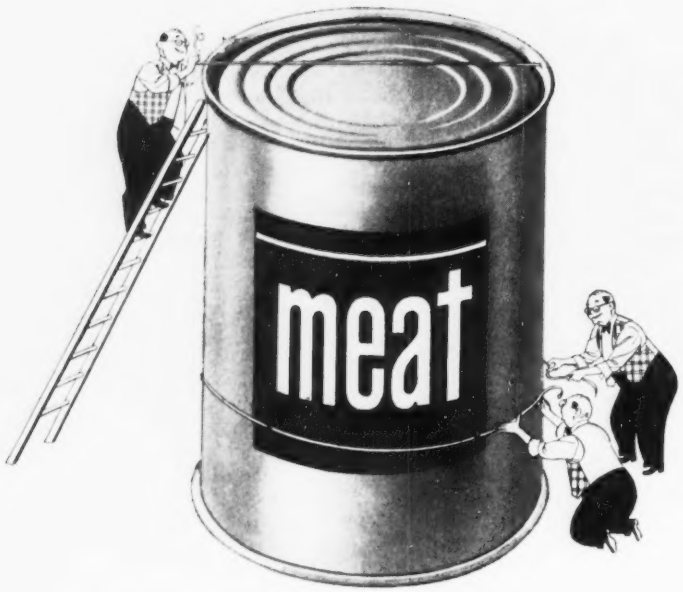
We envision eventual extension of mechanized bookkeeping to many other procedures—industrial engineering, livestock control, production records, departmental accounting, stock and dividends, all will be punched.

And while production is uncontrollable, as such, in meat packing, items like complete inventory card control and available, understandable, tabulated data on all operations literally point to planning and benefits.

As far as the future mechanics of this technique are concerned, anything is possible. For instance, automatic scaling may occur right in the plant for transmission to a central tabulating room punch. Or such information could be brought in and "stored" for future use by an electronic calculator.

As a matter of fact, it is not too starry-eyed to predict that tabulating may soon become completely automatic with incoming orders, for example, going into the system on tape and issuing as fully prepared orders, labels, and subsequent invoices.

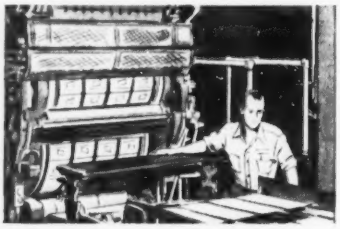
***Meat Special***




# Let us measure you three ways for hand-tailored meat can service

When you call on Continental for cans for meat products, we treat you as if you were our only customer. We hand-tailor our deliveries, lithography and engineering to your particular needs. We do our level best to do things your way. If you'd like this kind of service, it's yours for the asking. Why not get in touch with Continental today.

**VARIETY.** Continental makes meat cans in all standard sizes and shapes, but we are always ready to discuss special designs. If you have a package problem, let us help you solve it.



**LITHOGRAPHY.** Our artists are masters at giving your design sales-appeal. Our platemakers and pressmen work with the most modern equipment to give you sharp, clear reproduction.

**ENGINEERING.** As a Continental customer, you have available the services of experienced scientists and engineers to help solve processing and packaging problems quickly and economically.

## CONTINENTAL CAN COMPANY

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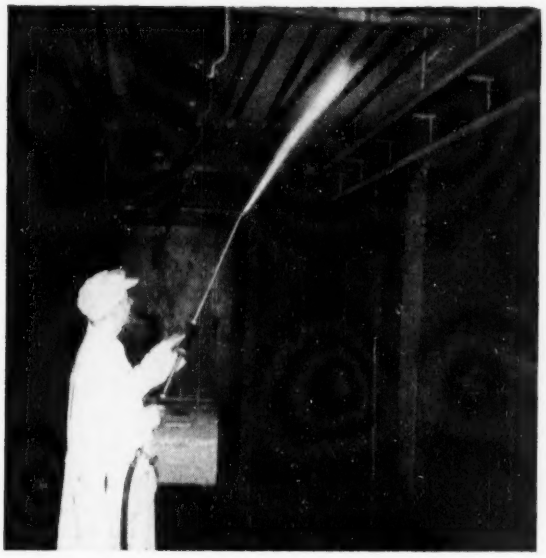
Eastern Div.: 100 E. 42nd St., New York 17 • Central Div.: 135 So. La Salle St., Chicago 3 • Pacific Div.: Russ Building, San Francisco 4



**HEAVY** carbonized soil is quickly removed from smokehouse walls by spraying with hot cleaner solution.

**FLOORS** are cleaned better and faster with aid of hot spray unit that delivers detergent under pressure.

# *These Streamlined Practices*
# Cut Packers' Cleaning Costs

New Equipment, improved detergents, advanced methods are raising sanitary standards and increasing labor efficiency in meat plants

**KEN C. TUCKER and RUDY FISKE**

Respectively, Food Industries Division and Sales Department, Oakite Products, Inc., New York City

A good way to gage your progress is to see where you stand today and compare it with yesterday.

If you are satisfied there has been improvement, the next step is to determine where you want to be tomorrow.

For a glimpse of the past in the meat packing field, talk to any old timer. Or if you are a veteran yourself, turn on your memory. You will recall rather rugged conditions, inadequate equipment fashioned from hard-to-clean materials that made hygienic aims difficult to achieve.

Meat packing sanitation has certainly come a long way in the last few decades. There is no question that sanitary standards today are far higher. For a clue to the future, an appraisal of the most modern methods now prevalent will serve to indicate the trend. It is unquestionably that mechanized, systemized cleaning is coming into its own and that is the direction toward which the future points.

Let's put the case for mechanized cleaning. It is based on the following vital considerations:

1. **High sanitary standards**
2. **Continually increasing wages**
3. **The need for greater production from existing plant facilities**
4. **The need for maximum economy in plant operation to keep meat and meat product prices within the reach of all**

Old fashioned bucket-and-brush methods performed by unskilled labor simply cannot meet these requirements. Experience has shown that one well-trained employee who has a machine and a quality cleaning agent tailormade for the job can do the work of several unskilled laborers in less time and for less money. And he will do a superior job.

But to gain maximum benefits from the switch from bucket-and-brush, there is need to–

. . . ascertain which jobs can be effectively handled with mechanized equipment, such as hot spray units, steam guns, pressure spray washing machines, tumbling barrels, and soak tanks or vats.

. . . select the best detergents for each job according to the metal to be cleaned, the type of soil to be removed, water hardness, and other factors.

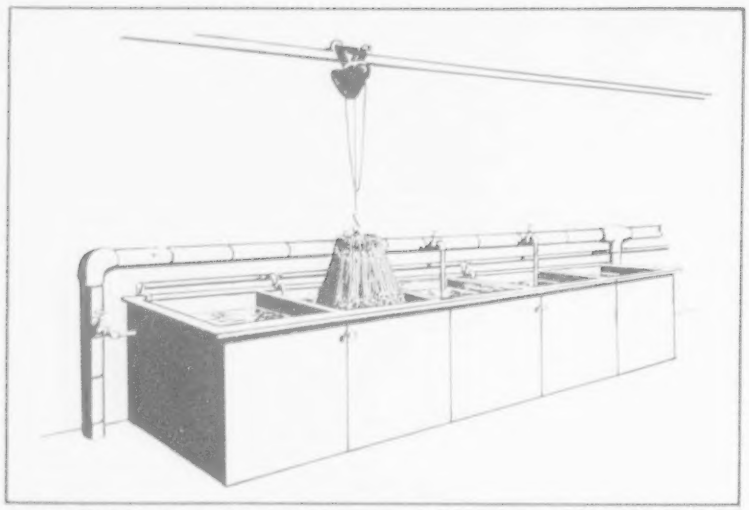
. . . choose and train competent personnel, and put them under able supervision.

### Which Jobs Are Mechanizable

Packers have discovered that the hot spray unit simplifies and cuts down cleaning time on smokehouses, ingredient trucks, bacon trees, rendering and cooking kettles, eviscerating and cutting tables, floors, walls, and ceilings. They have also found that the unit is useful for paint stripping.

Hot spray cleaning introduces three powerful soil-combating elements–detergent action, heat, mechanical force

***Meat Special***



**FIVE-TANK** cleaning system handles up to 500 trolleys per hour. Procedure: (1) Precleaning in medium to heavy duty alkali, (2) rinsing in hot water, (3) de-rusting in mildly acidic cleaner, (4) rinsing in hot water, (5) oiling.

—all working simultaneously. Hand brushing and hosing can never equal its effectiveness. The detergent can be sprayed on surfaces as far away as 15 ft. from the gun nozzle at 1½-2 gal. per min. Thus the worker can cover a large area with minimum of movement.

Soak tank cleaning can be used in many places where hand brushing methods are now employed. Meat-loaf pans, both aluminum and steel, smokesticks, trolleys, and gambrels are some of the items that can be economically cleaned by this method.

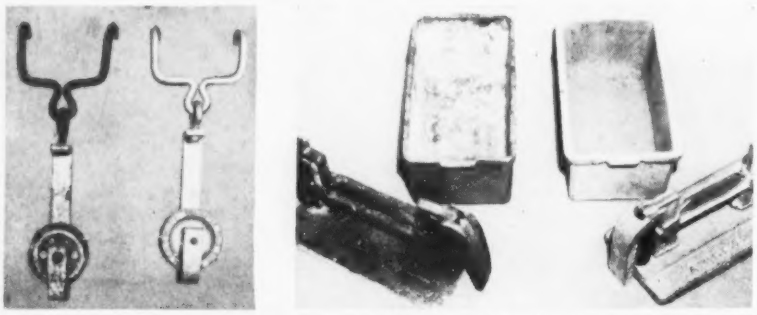
When using it, be sure the tanks are operated properly, and charged with the correct detergent. Heat them with enclosed steam coils to prevent waste through dilution, as when heating with an open steam line.

Selection of detergents can also be on a systematic basis following a few common sense guides. Good cleaning agents are compounded for certain types of work and will give best results when used for the job designed. For example, heavy carbonized soil found in smokehouses will require a stronger detergent than the light soil on meat trucks or cutting tables.

Detergents should always be used at recommended concentrations. Using too much is wasteful, too little inefficient. Buy cleaning compounds in terms of results, not on a cost per pound basis.

Experience has also shown that selection and training of competent personnel is just as important as mechanization and the use of proper detergents. One of the surest ways to waste time and money and destroy efficiency in sanitary maintenance is to place unsupervised employees on cleaning jobs. A second is to use the cleaning crew as a labor pool for other departments. And a third is to let it be a retreat for incompetents or cast-offs from other departments. The day that a well-designed machine, loaded with the proper detergent, is placed in the hands of a well-trained employee under competent supervision, is the day that cleaning costs go down and sanitary standards go up.

## Before and After



**RESULTS** of proper cleaning. Left: Trolleys. Right: Aluminum ham boilers.

Best way to evaluate the above contentions is to study results achieved in various plants that have partially or entirely adopted mechanized, systematic cleaning. A Nebraska plant cleaned a wooden block beef loading dock every week. The job took 24 man-hours under old methods. When a hot spray unit, charged with a highly alkaline cleaner, was used, time was cut to 12 hrs. Previously, the dock was heavily soiled with bits of fat and meat smeared and embedded into the wood by the wheels of power tractors. Hot spray cleaning not only made possible the time saving, but also did such a thorough cleaning job that the grain of the wood could once again be seen.

In another plant, it took 10 hr. of overtime per day for manual cleaning of the whole killing department—tiled walls, galvanized iron and wood eviscerating tables. With the use of a hot spray unit, this same plant now easily handles this cleanup during the regular workday.

Cleaning fire-glazed brick in heavily carbonized smokehouses was always a time-consuming job for a Minnesota meat packer. It formerly took one man 4 hr. to clean one smokehouse by manual scrubbing, scraping, and rinsing. One man, using a hot spray unit, now takes only 1 hr. for each smokehouse.

Application of the hot spray unit is not restricted to flat surfaces. Turkey and chicken canning plants use it for cleaning cooking kettles. These kettles are large—capacity 1,000 gal.—and when cleaned manually they take better than 1 hr of working time for each kettle. By the hot spray method, a kettle is cleaned in 30 min.

Two men were formerly kept busy all week cleaning the walls of a large meat cooler in a Spokane plant. The area covered and the height of the walls, which called for the use of ladders for the upper level, accounted for the time spent. With the hot spray technique the same men do the job in 4 hr. with no ladders required. Success with wall cleaning led the packer to use this method for cleaning bacon racks and trees, again with substantial savings in time and money.

### Soak Tank or Vat Cleaning

Among the best candidates for tank cleaning are trolleys, often neglected until they operate sluggishly or become contaminated. Tank cleaning and oiling at definite intervals—once a day to once a week—will keep them in good shape at low cost. Heavy duty alkaline materials and specialized acidic de-rusting compounds are available for this work.

Batch cleaning and de-rusting of

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## This 50 gal. Wear-Ever aluminum drum weighs only 25½ lbs.

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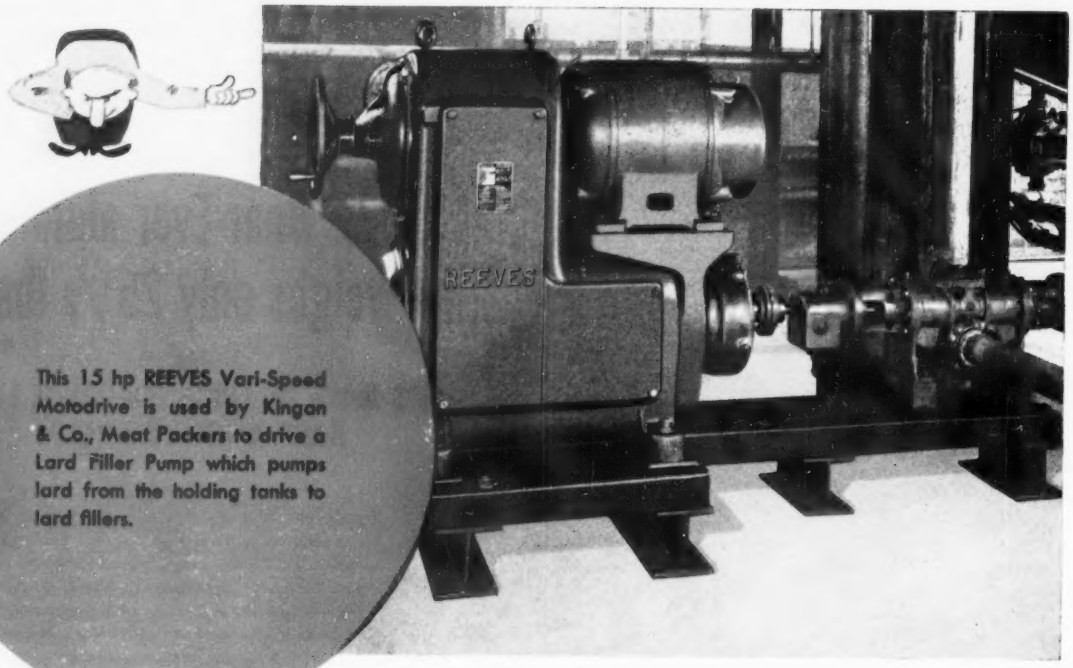
For more information, use coupon on page 157.




This 15 hp REEVES Vari-Speed Motodrive is used by Kingan & Co., Meat Packers to drive a Lard Filler Pump which pumps lard from the holding tanks to lard fillers.

# Cut costs—increase production with

# REEVES Variable Speed Control

REEVES Variable Speed Control makes your machines more accurate, more flexible, more productive . . . synchronizes them to the required speed and timing of different materials, shapes, sizes and operators. Anywhere—*anytime* REEVES Control gives you infinitely variable, stepless speed adjustability . . . simply with the touch of a button or the turn of a handwheel.

REEVES complete line includes a model for every specialized need—capacities up to 87 hp—speed ratios as great as 16:1 . . . is standard equipment on more than 2750 different makes of machines. Let a REEVES Engineer examine your speed control problems . . . show you how you can bring your machines, materials and operators into perfect synchronization . . . to cut costs . . . increase production. Send today for complete 132-page catalog. Specify Dept. FE58-1-G.

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## Choose from the complete line—REEVES!

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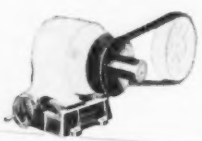
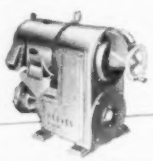


**Vari-Speed Motor Pulley** converts any constant speed motor to an accurate, variable speed drive with 4:1 ratio. Rugged, dependable—sizes to 10 hp. **Vari-Speed Jr.** available for light machinery.



**Motodrive** combines motor, speed varying mechanism and reduction gears in one single, compact unit. Speed variations 2:1 to 10:1. Sizes from fractional to 30 hp.

**Flexi-Speed Drive** is the most versatile, most economical variable speed drive with 8:1 speed range. Mounts in any position . . . drives in any direction. Available in ½, ¾ and 1 hp.



For more information, use coupon on page 157.

trolleys and gambrels can be accomplished with a minimum of labor, cleaning materials, and floor space. Large plants requiring a heavy turnover of cleaned units will look favorably on a continuous system of cleaning and oiling trolleys, and working gambrels. A cleaning lane is installed in the return conveying system from cutting and shipping departments back to the killing and dressing floors. Collecting, washing, rinsing, drying, oiling, and discharging the trolleys and gambrels are accomplished automatically on one conveyor unit. This installation will handle up to 2000 units per hour.

When a plant's facilities don't warrant a continuous system, an installation of three to five soak tanks will suffice. From 300-500 trolleys can be cleaned, de-rusted, and oiled per hour. Accepted procedure is to work as follows:

1. Pre-clean in medium to heavy duty alkaline cleaner
2. Hot rinse
3. De-rust in inhibited mildly acidic cleaner
4. Hot rinse
5. Oil for rust protection and lubrication of roller parts

Cleaning and prevention of "meat packer's white corrosion" of galvanized metal-curing or belly boxes is a major problem in most meat packing establishments. The following method using properly selected cleaning materials is widely used, and it meets with federal inspection acceptance:

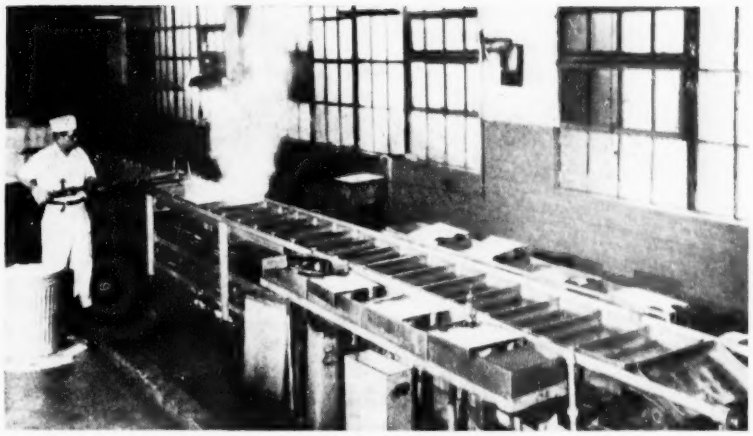
1. Immerse curing box in tank of special heavy duty cleaner, using an overhead hoist. Allow to soak 3 min.
2. Hot rinse
3. Immerse curing box in special acidic cleaner for 5 min.
4. Hot rinse
5. Immerse in white oil and allow to drain

### Slaughtering Department

Hog scalding, scraping, and polishing equipment is designed for a wide range of capacities, and will clean the smallest and largest hogs equally satisfactory. Continuous and uninterrupted production makes for a larger margin of profit. Especially is this true in the hog slaughtering department.

In Spring and Fall scalding operations present certain problems. The scurf is difficult to remove and new hair coming in is very stubborn, often necessitating time-consuming singeing or burning. Plants located in hard-water areas are particularly affected.

Use of materials with special surface-active and lime-sequestering agents, combined with lime in some instances, provides more thorough cleaning, leaving hogs clean and white, after dehairing. It is important to keep the dehairing and polishing units properly cleaned and maintained, otherwise efficient scalding is a waste of time. Dehairing units frequently require replacement scrapers or blades to avoid subsequent extra hand scraping.



**STEAM GUN** does effective, economical cleaning job on conveyorized eviscerating table in poultry plant.

### Pans, Molds, Smokesticks

Although many meat packers still clean meat molds and pans by soaking and hand brushing, considerable progress has been made with mechanical washing.

A rotary type washing machine is now available that cleans, rinses, and sanitizes up to 150 molds and their lids in 1 hr. The unit contains a two-level turntable, the molds and pans going on the lower level and the lids on the upper. The solution tank is charged with detergent, the door is closed, and the entire cleaning, rinsing, and sanitizing cycle is performed automatically.

Cleaning and rinsing is accomplished with high pressure sprays that hit the molds from every direction—180 deg. F. water does the sanitizing. Approximately 3-lb. of detergent are required for the initial charge, and 1-lb. is added during an average 8-hr. run. In other words, mechanization makes it possible to clean and sanitize up to 1,200 molds and lids in a day with only 4 lb. of detergent.

Meat molds or boilers, and loaf pans should be cleaned immediately after products are removed. Never let the briny grease or gelatine dry on the molds and pans, since this dried-on film makes for difficult cleaning. Place the molds in a tank of water if they can't be cleaned immediately. Care should be exercised in selection of cleaning material, because the molds, boilers, and loaf pans are made of stainless steel and aluminum. Cleaners that may be safe on stainless steel will badly "pit" aluminum surfaces.

Aluminum smoke sticks present no cleaning problem, provided the aluminum alloy used is not high in copper content. When this condition does exist, then a "greening" problem occurs. Investigation shows that the condition can be corrected if, after cleaning and brightening, the smokesticks are allowed to set for 24 hr. But not all meat packers are in a position to follow this procedure.

Further field production tests reveal that the "greening" condition can in most instances be eliminated by omitting pre-cleaning with an alkaline cleaner. Just immerse the smokesticks in a specially formulated, mildly acidic cleaner for 10-15 min. After this cleaning give the sticks a hand wipe rinse and then rinse for a short period in hot water. A regular smokestick tumbling barrel can be used for this final rinsing. It is the fastest, most economical method.

### Brightening Galvanized Equipment

Most small meat packing plants still wash ham molds, loaf and chili pans by hand in a sink or vat. Detergent used should not be of a type that will attack the metal of the pans or the workman's hands. Pan washing is always a "headache" to any sausage kitchen. It can be made easier, however, if pans are soaked for 5 min. before hand brushing. Nesting of pans should also be avoided. Plants having a rotary brush in a shallow sink or tank should guard against using a cleaner with high wetting-agent content because of excessive sudsing.

White deposits on galvanized meat trucks, and other equipment, are es-

(*Turn to page 100*)

***Meat Special***

WHAT'S NEW AT BRISTOL . . . . WHAT'S NEW AT BRISTOL

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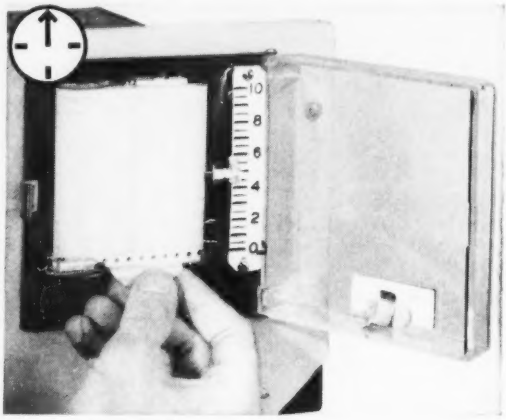
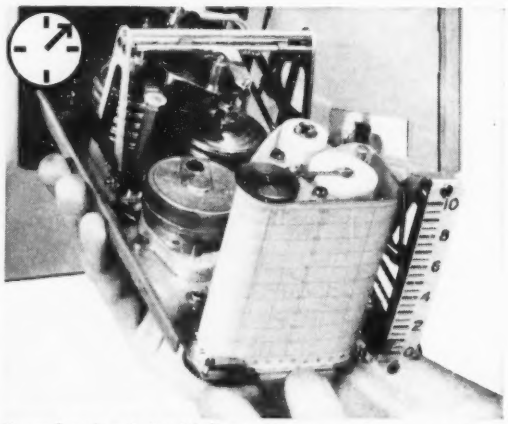
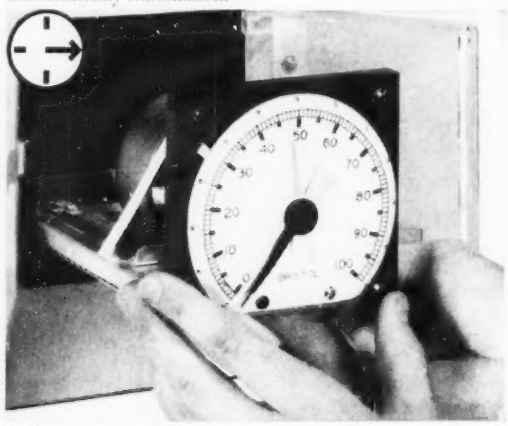


Case door is opened.



Recorder chassis is withdrawn from case. Air pressure is automatically maintained.

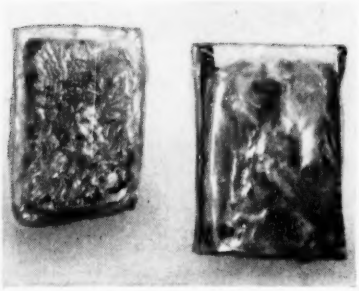


Indicator chassis is plugged into same case.

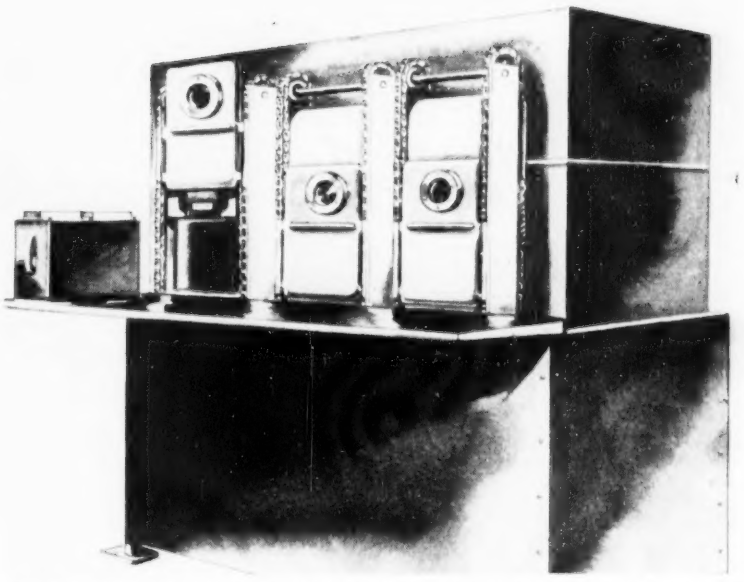
# BRISTOL

*THE DEPENDABLE GUIDEPOST OF INDUSTRY*

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS



**TEST** with boiled ham samples (both prepared last Mar. 12) tells the story. That on left was overwrapped in cellophane; the one on right was put up in D-517 saran and hi-vac-gas packed.



**MODEL** of triple-chamber unit which handles packages in special carriers (left). It evacuates, blankets, and weld-seals almost a package per second.

Welds seal electronically after evacuating air and purging with inert gas. Handles 50 per minute

# New Hi-Vac Packager Keeps Meat Longer

**FE STAFF**

Imagine casually opening a packet of four-month-old, cooler-held sliced veal loaf and enjoying its contents.

That's exactly what the author did during a recent visit to Electronic Products Corp., pioneering Chicago packaging firm. And veal loaf was but one of many surprisingly long-lived items packaged months ago by a new and unique machine.

Designed for plug-in installation in the average packaging line, this machine is capable of automatically performing these operations:

- ▶ Evacuating all package sizes and films to below 0.4 in absolute.
- ▶ Blanketing the product with a controlled quantity of inert gas.
- ▶ Electronically sealing the package in a single-layer "welded" strip.
- ▶ Running through its sequenced operations at over 50 items per minute.

This packaging innovation has been tried and proved only in prototype form in the pilot plants of several major meat packers. But by the time this is in print, five commercial units are expected to be installed in production lines in as many packaging plants throughout the country.

Key to the operation is the method of sealing. A high-frequency transmitting circuit—upwards of 20 megacycles—is used to dielectrically heat the two joining film surfaces between clamped metal jaws. Resulting is a true weld, or a fusion. And a sealed package filled with gas can withstand the weight of a 200-lb. man.

Another virtue of the method is its control of vacuum on an absolute rather than time basis. An absolute-pressure gage compensates for atmospheric changes and assures a precise 0.4-in. vacuum.

The machine is designed to introduce inert gas into the package because a high vacuum produces a strain on the container, making it liable to rupture with rough handling. The gas is jetted into the packaging chambers from holes in spreader pipes above and between the air-powered sealing jaws.

Various films and package sizes have been tested in the machine. And it handles any of the plastic films, including Saran.

To achieve speed, the unit employs three chambers. These perform phases of their cycle in sequence and have simple, power-cylinder-operated loading and unloading features. With one operator, the unit can handle 50 to 55 small luncheon-meat packages per minute.

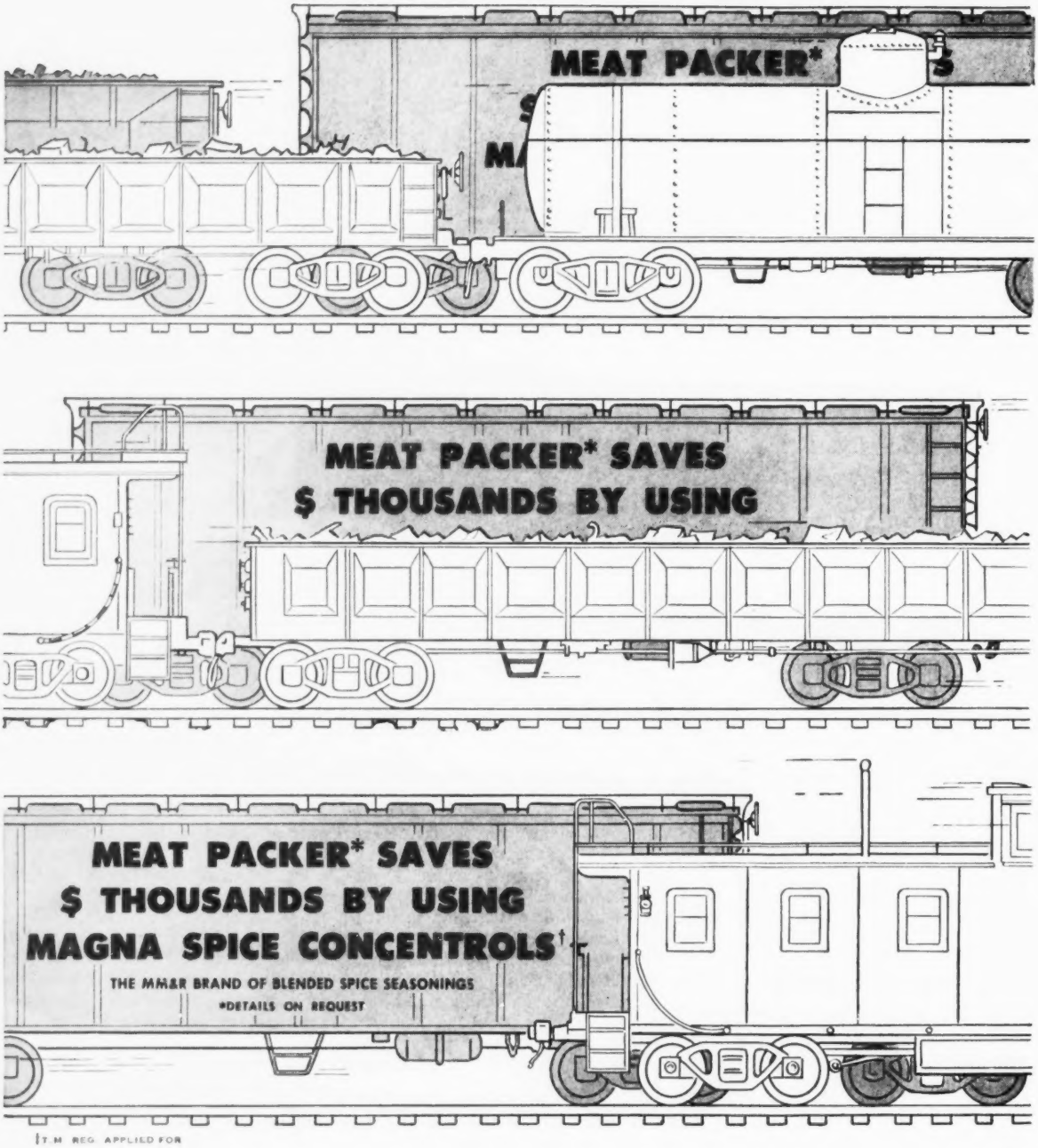
Unsealed packages come to a waist-high feeding station in groups of four inside a box-like vertical carrying fixture. When a chamber is ready, air cylinders open the door and eject a finished batch. Then the operator simply pushes in the unsealed batch. And that, plus sending finished goods on their way, is all the attendant has to do.

Operating expense amounts to only about 0.1c. per package. Power consumption is 4kw. per chamber.

Many products have been packaged on the new fast-cycle machine in the company's laboratory to check performance of the method. Not only veal loaf, but frankfurters, ham, bacon, and various cold cuts are being age tested. These are periodically checked for color, mold, and flavor. And they are compared to control samples sealed in the same material by conventional means.

The amazing keeping quality of these samples can be attributed basically to that extra removal of oxygen that the high-vacuum system achieves. The unit takes the package down to about 0.5 percent of oxygen and then makes a very effective seal to hold it.

Gas blanketing involves some interesting factors. The inert gas which cushions the package against stress prevents the film from clinging to the product. But some packers prefer a certain amount of cling because of the eye appeal. So to suit varying likes, provision is made to vary the amount of gas in the cycle.




†T.M. REG. APPLIED FOR

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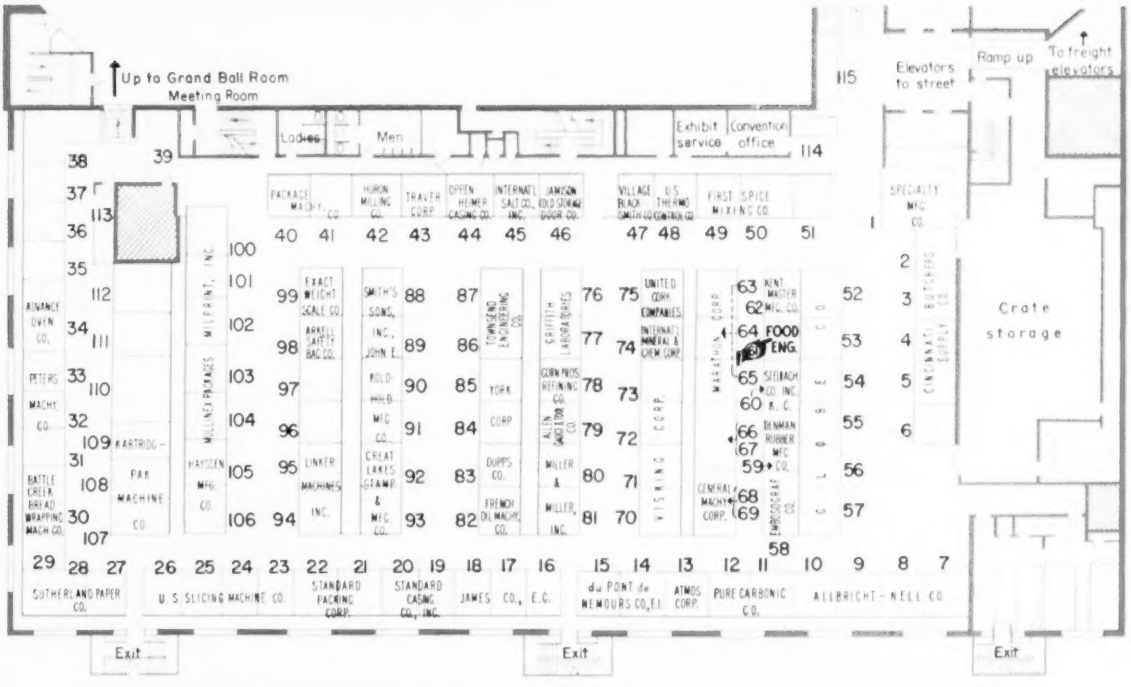



# EXHIBITORS AND FLOOR PLAN

# American Meat Institute

## Annual Meeting, October 2-6, 1953, Palmer House, Chicago

| Exhibitor | Booth |
|---|---|
| Advance Oven Co. | 34 |
| Afral Corp. | Annex |
| Allbright-Nell Co. | 7-8-9-10 |
| Allen Gauge & Tool Co. | 79 |
| Alum. Cooking Utensil Co. | 66-67 |
| Arkell Safety Bag Co. | 98 |
| Atmos Corp. | 13 |
| Battle Ck. Bread Wrapping Mach. Co. | 30 |
| Cesco | Annex |
| Cincinnati Butchers Supply Co. | 2-3-4-5 |
| Corn Products Refining Co. | 78 |
| Crown Zellerbach Corp. | 103-104 |
| Denman Rubber Mfg. Co. | 59 |
| Dewey & Almy Chem. Co. | 402-403 |
| Dohm & Nelke, Inc. | 114 |
| du Pont de Nemours Co., E. I. | 14-15 |
| Dupps Co. | 83 |
| Embosograf Co. | 58 |
| Exact Weight Scale Co. | 99 |
| First Spice Mixing Co. | 49-50 |
| FOOD ENGINEERING | 61 |
| French Oil Machy. Co. | 82 |
| Fuller Brush Co. | Annex |
| General Machy. Corp. | 68-69 |
| Globe Co. | 52 thru 57 |
| Goodyear Tire & Rubber Co. | 29 |
| Great Lakes Stamp & Mfg. Co. | 92-93 |
| Griffith Laboratories | 76-77 |
| Hayssen Mfg. Co. | 105-106 |
| Hercules Fasteners, Inc. | 96-97 |
| Huron Milling Co. | 42 |
| Internat'l Mineral & Chem. Corp. | 74 |
| Internat'l Salt Co., Inc. | 45 |
| James Co., E. G. | 16-17-18 |
| Jamison Cold Storage Door Co. | 46 |
| Kartridg-Pak Machine Co. | 107-108-109 |
| Kentmaster Mfg. Co. | 62 |
| Koch Supplies | 6 |
| Kold-Hold Mfg. Co. | 90-91 |
| Linker Machines, Inc. | 94-95 |
| Liquid Carbonic Corp. | 31 |
| Marathon Corp. | 63-64-65 |
| Mayer & Sons Co., H. J. | 33 |
| Miller & Miller, Inc. | 80-81 |
| Miller Wrap. & Seal. Mach. | 111-112-113 |
| Milprint, Inc. | 100-101-102 |
| Mullinex Packages | 103-104 |
| Oppenheimer Casing Co. | 44 |
| Package Machy. Co. | 40-41 |
| Pavia Process, Inc. | Annex |
| Peters Machy. Co. | 32-33 |
| Preservaline Mfg. Co. | 110 |
| Pure Carbonic Co. | 11-12 |
| Seelbach Co., Inc., K. C. | 60 |
| Sellers Injector Corp. | 51 |
| Smith's Sons, Inc., John E. | 88-89 |
| Specialty Mfg. Co. | 1 |
| Speco, Inc. | 1 |
| Standard Casing Co., Inc. | 19-20 |
| Standard Packing Corp. | 21-22 |
| Sutherland Paper Co. | 27-28 |
| Sweeney Litho. Co. | 38-39 |
| Townsend Engineering Co. | 86-87 |
| Traver Corp. | 43 |
| Union Asb. & Rubber Co. | 115 |
| United Cork Companies | 75 |
| U. S. Slicing Machine Co. | 23-24-25-26 |
| U. S. Thermo Control Co. | 48 |
| Village Blacksmith Co. | 47 |
| Visking Corp. | 70-71-72-73 |
| Wass Food Prod. Co. | 36 |
| Weber & Co., H. G. | 37 |
| Westinghouse Elect. Co. | Annex |
| York Corp. | 84-85 |

## Lard Scores Again

—*Continued from page 73*

tion.*** Apparently, Bailey skirted the process that was later evolved.

### Armour Probers

In an effort to prepare a better shortening from lard, two Armour chemists, R. J. Vander Wal and L. A. Van Akkeren, achieved some unexpected laboratory results. By properly evaluating and interpreting their results, these scientists discovered that they had come up with a relatively simple and effective means of improving lard by methods which involve molecular modification.

A patent for this new process was applied for and granted as U. S. No. 2,571,315, on Oct. 16, 1951, and reissued 23,499 May 20, 1952. Additional U. S. and foreign patents are also pending.

As described in the patent, the process appears relatively simple—but its results are startling. In brief, it consists of heating lard (at any temperature between about 150 deg. C. and the lowest at which it is liquid) with an alkali metal alcoholate. The latter acts as a catalyst that causes the fatty acids to migrate.

Liken the redistribution of fatty acids to the shuffling of a deck of cards, to then be dealt, three each, to the glycerine molecules in some new order or sequence determined by the conditions of the process. Thus, from a predominant undesirable fatty acid distribution a new arrangement, believed to be associated with the desirable properties of hydrogenated vegetable shortening, is effected.

The alkali metal alcoholate used in the present Armour process is sodium methoxide, which is commercially available at a low cost. A finished shortening is prepared by inactivating this catalyst after use, removing soaps by standard procedures, and blending large proportions of the product with other fats.

### Product Gains

After thorough investigation on a laboratory scale, the process was further developed in the pilot plant. Next came approval of product wholesomeness by governmental agencies, with limited commercial production. Recently, a specifically designed new high-volume plant went into operation in Kansas City (process detailed on our foldout flowsheet, pages 102-105).

Baking tests with the new lard were highly satisfactory from the start. The standard for a good quality hydrogenated vegetable oil shortening is a pound cake with a volume of 250 c.c. per 100g. of cake. The new product, blended with a minor proportion of highly hydrogenated fat, is stated to have consistently produced cakes with a volume substantially above 260 c.c. per 100 g.

### Cake Volume Tells Story

Compare this to the best conventional lard, hardened in the same manner, which rarely gives a pound cake with a volume above 225 c.c. per 100g.—with an actual average lying between 192 c.c. and 214 c.c.

In addition, the product retained excellent properties, closely approximately those of lard, for pastries and breadstuffs. It was bland and odorless and could be stabilized against rancidification with the usual antioxidants. Toxicity studies showed that the chemical treatment had left no undesirable constituents.

In subsequent studies, properties above and beyond expectations were revealed. For one thing, the modified lard has the advantage of not containing significant quantities of the undesirable iso-oleic acid groups formed during hydrogenation, hence it innately offers a better plastic range than most available vegetable shortenings.

Specifically, many hydrogenated vegetable shortenings tend to develop a hard texture when held at temperatures below 70 deg. F. Also there is a tendency toward almost unworkable softness when the product gets much above 90 deg. F. The new lard shortening is more plastic at lower temperatures and retains its body quite well above 90 deg. F.

This wide temperature tolerance should appeal to the commercial baker who is faced with seasonal temperature variations in his shop and storeroom.

### Vs. Deficiency Diseases

Another plus-factor offered by the new "all-purpose" meat-fat shortening is its inherent nutritional advantage in the form of unsaturated fatty acids that are unaffected by the process. These have been shown to provide a valuable dietetic quality in the prevention of certain eczemas and other types of deficiency diseases.

Actually, the new Kansas City production facility is but a step in manufacture of the commercial product, which is a finished shortening. This product is available in the regular and superglycerinated types, currently known under the brand names of "Purity" and "Sum."

### Future Plans

Modified lard shortenings have already been used successfully on a wide variety of products, including cakes, all kinds of cookies, bread, rolls, regular pie dough, donut mix, fried pies, and various types of restaurant frying.

However, despite enthusiastic consumer response, the company is going into this market slowly and plans an orderly development of an increasing number of commercial production facilities.

In order to make the benefits of the new process available, the company is ready to arrange suitable licenses and to assist others in introducing it into their operations.

*End* (*Resume reading on page 74*)

***See *Industrial Oil & Fat Products*, Vol. II.

**Meat Special**

## Cuts Cleaning Costs

—*Continued from page 95*

sentially a basic zinc carbonate. It is a normal action for zinc, exposed to moist air containing salt or other chemical, to corrode and form zinc salts such as a chloride, which in turn decompose in the presence of moist air to form zinc hydroxide. This is eventually converted into an insoluble basic zinc carbonate by the action of the carbon dioxide in the air.

These white zinc carbonate deposits are soluble in alkaline and acidic solutions. However, zinc is also soluble in these solutions, thus care must be taken to prevent damaging the galvanizing.

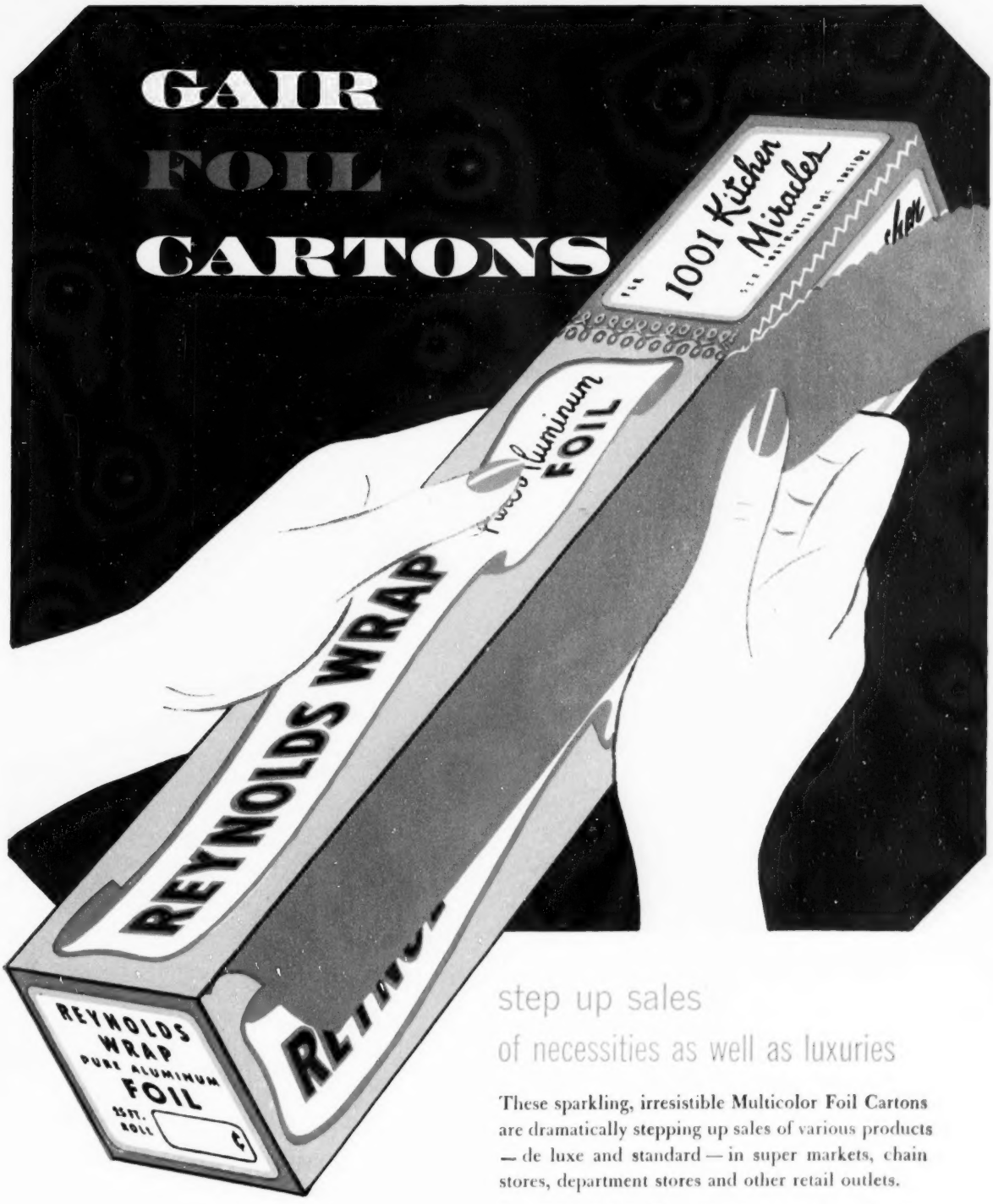
### Acidic Cleaners Best

It should also be noted that alkaline solutions containing silicates tend to react with the white deposits and the galvanizing to form an insoluble film of zinc silicate. This deposit is more difficult to remove than the zinc carbonate. On the other hand, acidic cleaning compounds react more favorably on these white deposits.

For most brightening or reconditioning work, the acidic cleaners are used in solution form, brushed or swabbed on equipment, allowed to soak 5-15 min., followed by final pressure rinsing. Materials may also be applied in paste form as a scouring powder.

*End* (*Resume reading on page 97*)

# GAIR FOIL CARTONS




## step up sales of necessities as well as luxuries

These sparkling, irresistible Multicolor Foil Cartons are dramatically stepping up sales of various products — de luxe and standard — in super markets, chain stores, department stores and other retail outlets.

Gair-Reynolds Foiline Cartons are now style leaders in folding cartons.

*Write for brochure on Gair Cartons*

**GAIR**

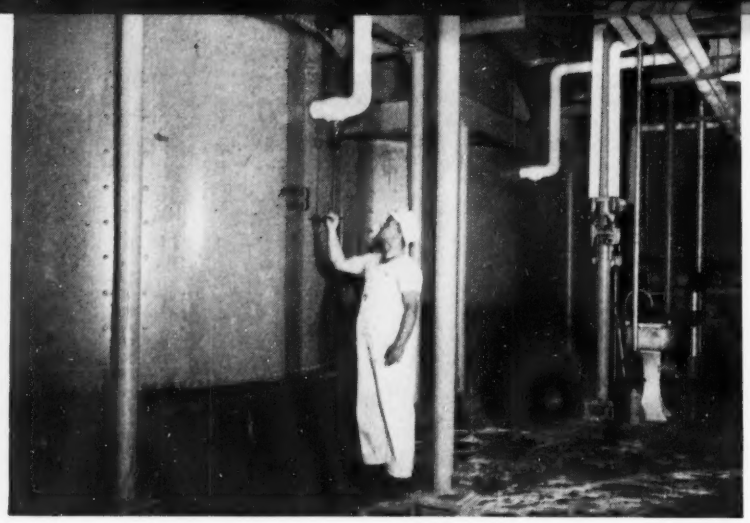
PAPERBOARD
FOLDING CARTONS
SHIPPING CONTAINERS

ROBERT GAIR COMPANY, INC. • 155 EAST 44TH STREET • NEW YORK • TORONTO

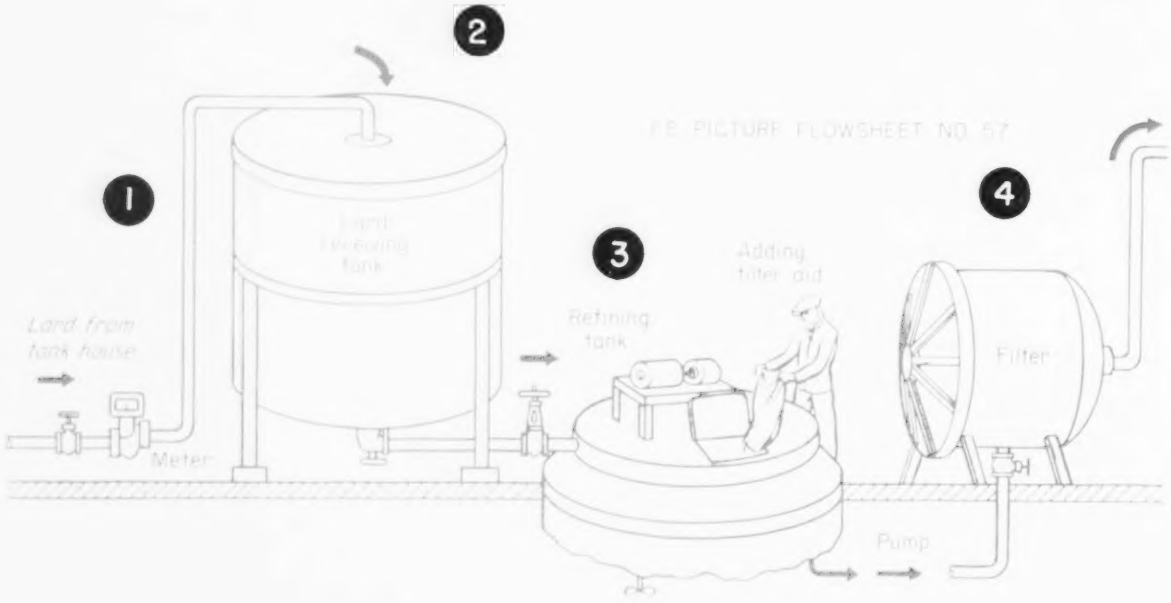


TURN PAGE FOR FOLDOUT FLOWSHEET →

1 **INCOMING LARD** is totalized in pounds on this indicating flow-meter.



2 **TEMPORARILY HELD** in these huge 65,000-lb. tanks, the lard can subsequently be routed to either the new process or conventional refining.




# Making Molecular-Modified Lard

## Exacting Techniques Mark Volume Pipeline Processing of New Armour Product

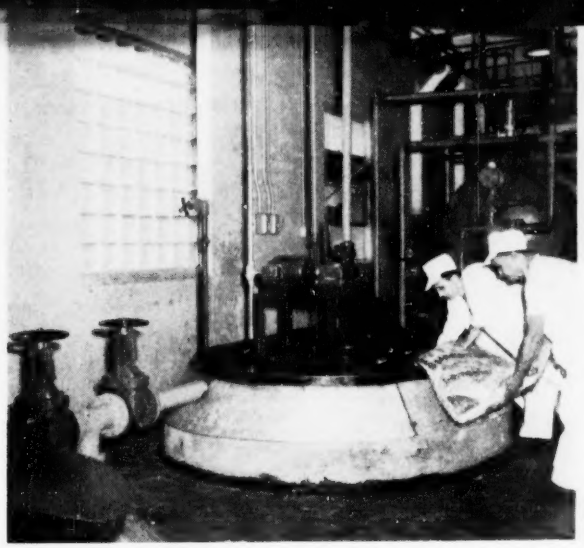
PRODUCTION of its new molecular-modified lard is a precision, pipeline operation at Armour and Company's Kansas City plant.

Liquid, unrefined lard comes in—Point (1) in accompanying diagram—from the local tank house or incoming tank cars and is pumped and metered into 25,000-lb. receiving tanks at the start of the new process. It then gravity-feeds to 15,000-lb. floor-level, agitated refining tanks, where filter aid is stirred in. From there lard is pumped, at about 30,000 lb./hr. through a wood-pulp coated plate-type Hercules filter, where it is polished to clear white.

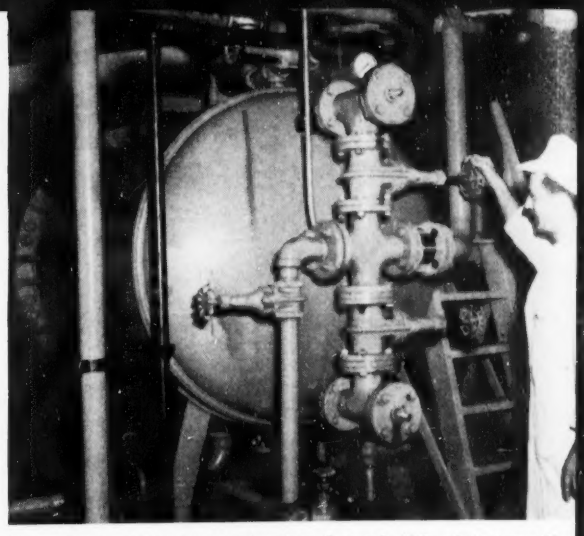
Filtered lard is then held in a 60,000-lb., coil-heated tank, where it is kept at 175-180 deg. F. Next, traces of water are removed by a continuous vacuum dryer, prior to its being pumped to one of two 5,000-lb. reactors tanks forming the "heart" of the new process—Point (6).

In the steam-coiled heated, agitator reactor tank, a calcu

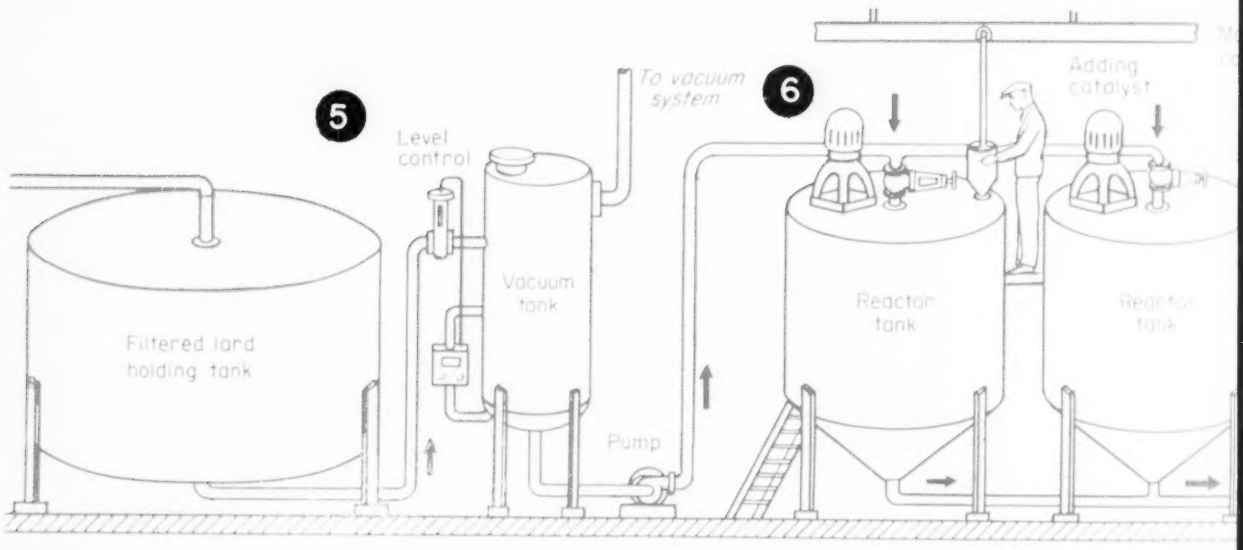
**FACTS BEHIND PHENOMENON of molecular modification are disclosed and significance explored in this month's special article, "Lard Scores Again"—on page 72.**



**3** **GRAVITY FED** into these floor-level 15,000-lb. refining tanks, lard gets filter-aid. Mix is then agitated.



**4** **LARD** is polished by blowing through this plate-type filte at 30,000 lb./hr. Operator adjusts output.




lated quantity of catalyst (sodium methoxide is currently used) is added from a railborne carrier. With this catalyst and gentle heat, a shifting of fatty acids on glycerine molecules takes place in a few minutes.

Modified lard then passes through a strainer and air separator and passes into a small-capacity, high-velocity mixer, where water is added in fixed proportion by a ratio control system. Throughput from this water deactivation process then passes through a tubular heater at 165 deg. F. to break the emulsion.

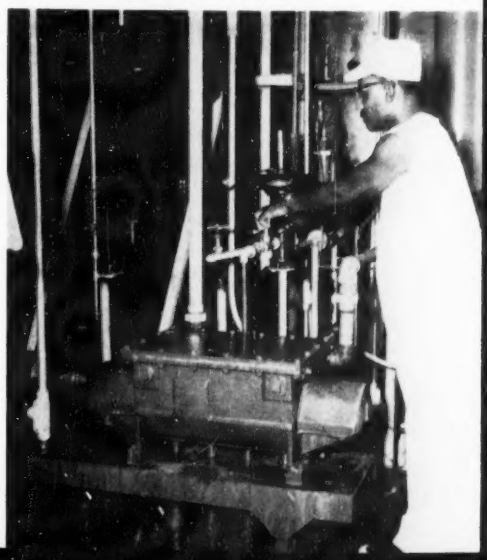
Mixture then passes, at 5,000 lb./hr. through a primary twin centrifuge that separates out the heavier foots and soaps. These drop to collecting tanks on the floor below.

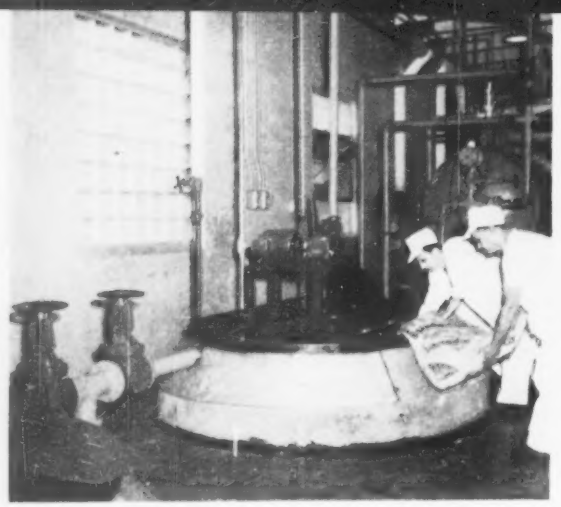
Partially separated lard is then run through a skimming tank and into a recirculating type hot water wash system. Here, remaining soaps are placed in solution. These are then removed—Point (11)—by a battery of four parallel secondary centrifuges at 1,200 to 1,500 lb./hr. Any remaining soaps go to a catch-basin.

The modified lard then is run through a vacuum dryer, at 1 to 1.5 in. mercury, where remaining traces of water are removed. Finished product is piped to holding tanks in the building for further processing into commercial shortening, or to tank cars for transport to other Armour refineries.

Remaining steps with the product are blending with other fats, deodorizing, plasticizing, tempering, and packaging.

**8** **LARD-WATER** emulsion is thoroughly agitated this small-capacity continuous mixer.





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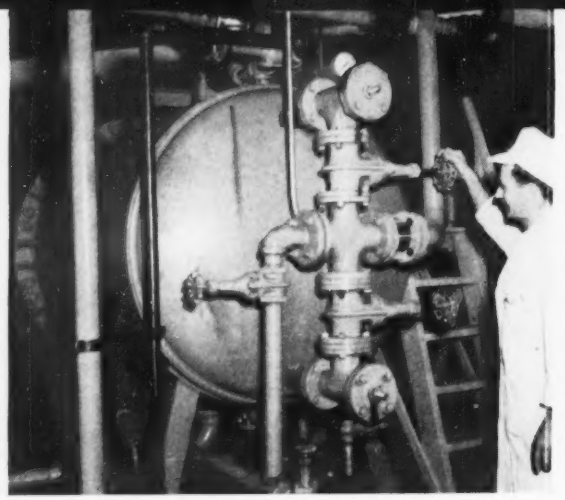
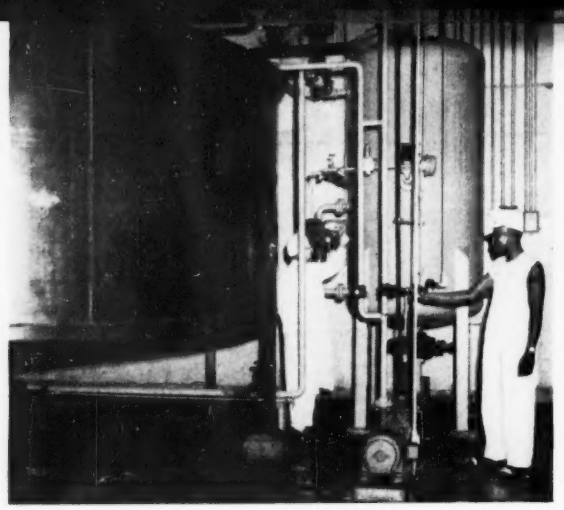
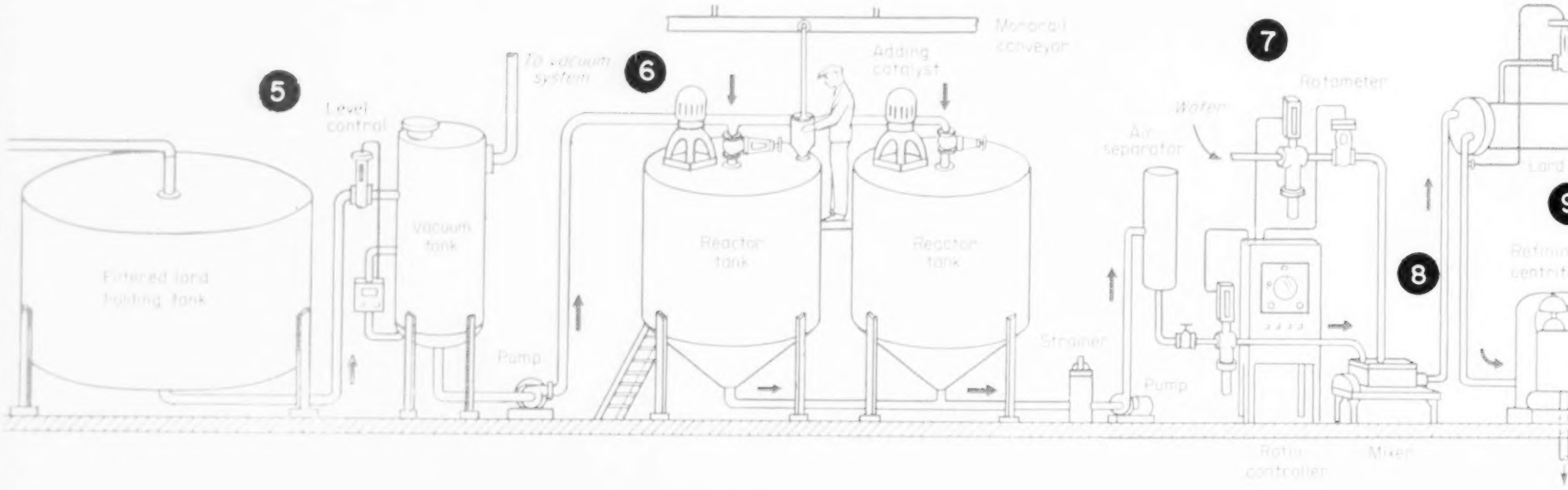


**4** **LARD** is polished by blowing through this plate-type filter at 30,000 lb./hr. Operator adjusts output.



**5** **FROM HOLDING TANK** (left) lard is pumped to vacuum dryer to remove water. Instruments control throughput.

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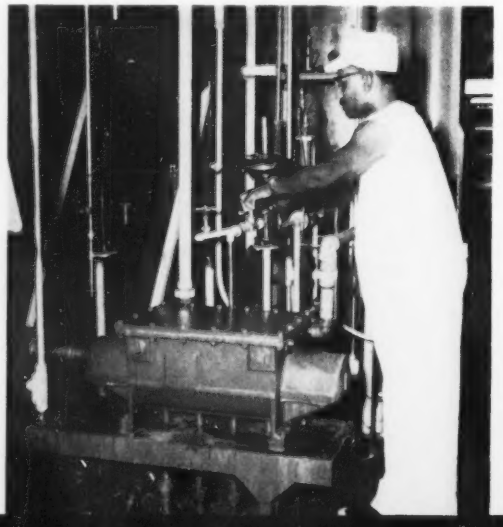
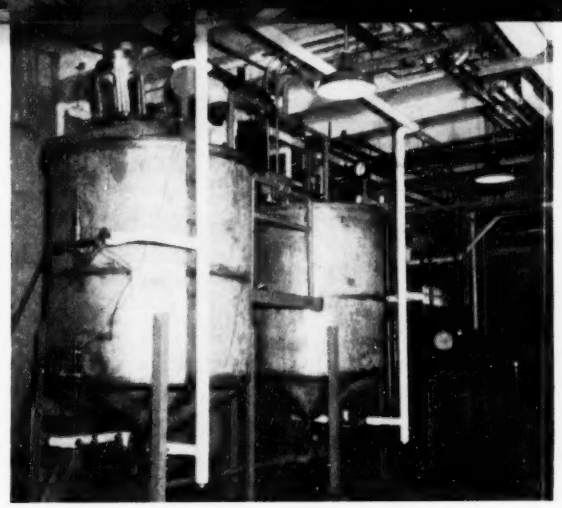
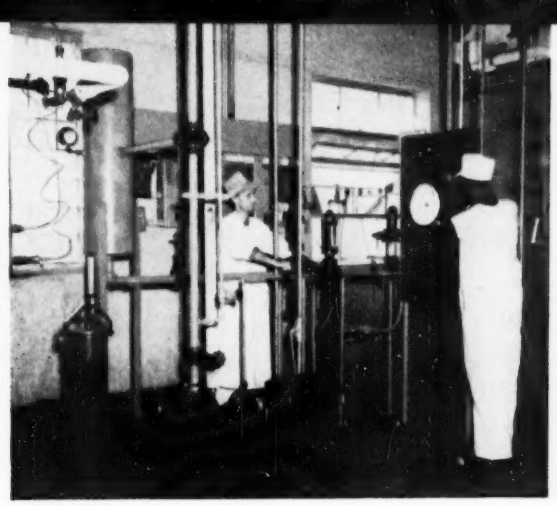


**9** **PRIMARY CENTRIFUGE** separates out heavier foots and soaps at about 5,000 lb./hr.

**10**



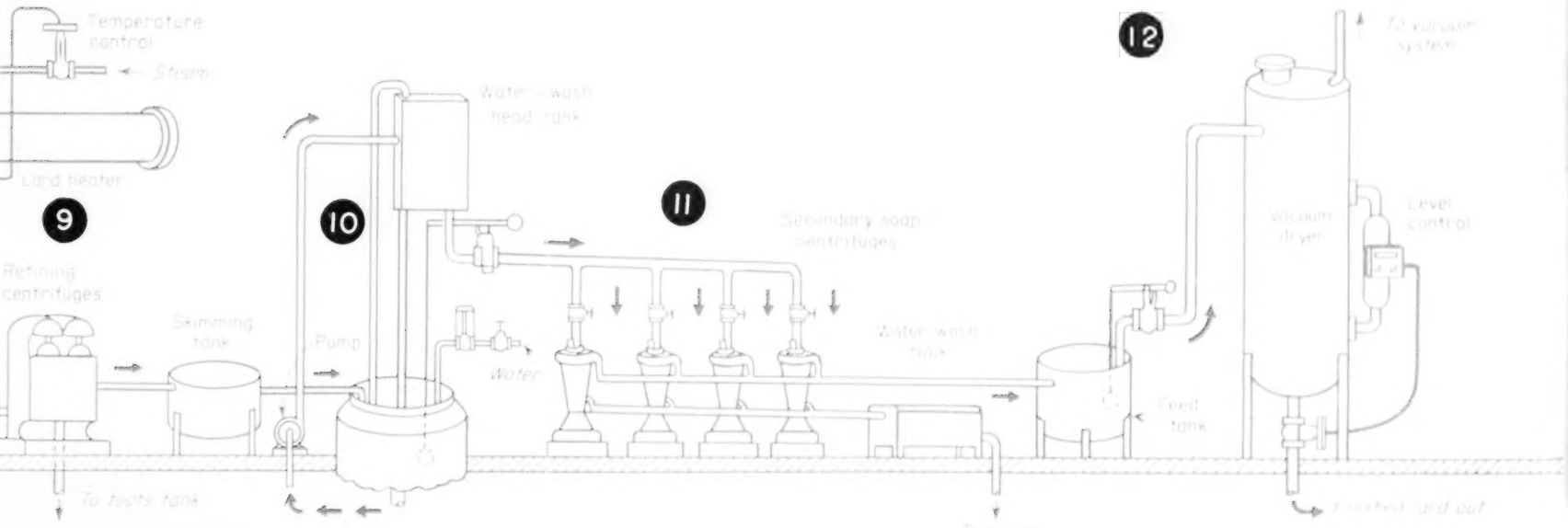
**6 REACTOR TANKS** operate batch-fashion in sequence. Catalyst goes in lard. Process time: Few minutes.



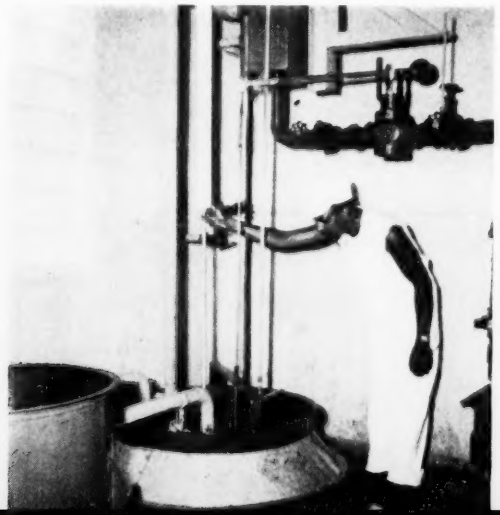
**7 DEACTIVATION** by proportioned water wash follows. Attendant sets ratio flow controller to critical value.

### LIST OF MAJOR EQUIPMENT

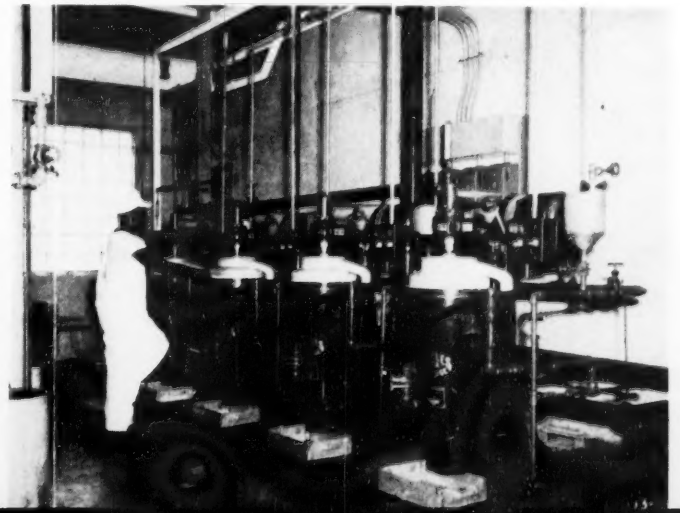
**Lard meter**—Pittsburgh Equitable Co., Pittsburgh
**Tanks**—Darby Corp., Kansas City, Kan.
**Filter**—Hercules Filter Co., Paterson, N. J.
**Vacuum dryers**—Black, Sivals & Bryson, Kansas City, Mo.
**Ratio control**—Fischer & Porter Co., Hatboro, Pa.
**Lard heater**—The Sharples Corp., Philadelphia
**Centrifuges**—The Sharples Corp., Philadelphia
**Level controls**—Fischer Governor Co., Marshalltown, Iowa.
**Pumps**—Worthington Corp., Harrison, N. J.; Allis-Chalmers Corp., Milwaukee
**Air separator**—The Sharples Corp., Philadelphia
**Strainer**—The Sharples Corp., Philadelphia
**Emulsion mixer**—The Sharples Corp., Philadelphia



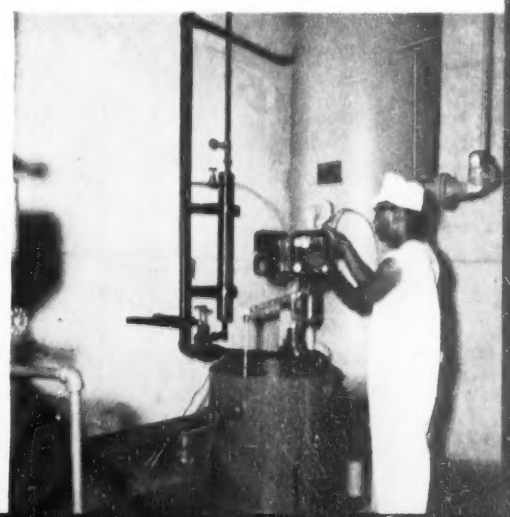

**10 SECOND WATER WASH** in this recirculating setup puts any remaining soaps back in solution.



**11 SECONDARY CENTRIFUGES** now completely remove the last traces of soap and send solution to catchbasin, leaving clear lard.



**12 FINAL DRYING** in this continuous vacuum unit brings water content to fraction of 1 percent.



# *2 Modern* Ways To Get That *Old-Fashioned* Meat Flavor

## ADVANCE *Revolving* MEAT LOAF OVEN

Meat is only as good as its flavor—and nothing brings out that full, rich, brown flavor so deliciously as an Advance Revolving Oven . . . scientifically designed to produce the kind of meat loaves "like mother used to bake"—in half the time.

With an Advance Oven you can always depend on flavor-rich, perfectly uniform loaf production. Here are a few of the reasons why:

### Special ADVANCE Features

- Partlow Thermostats
- Safety Pilots and Electric Ignition
- Completely Stabilized Shelves
- All-Steel and Aluminum Construction
- Drop-Type Doors—Serve as Platforms
- Minimum Heat Loss—Walls Packed on Job
- Modern Design. Clean, long-lasting Exteriors—choice of Porcelain, Stainless Steel, Aluminum

***3 Oven Sizes to Meet Your Particular Needs***

Models available in 96, 144 and 192 meat loaf capacities.

## ADVANCE *Thermostatically-Controlled* DIP TANK

Converts meat loaves, hams and other meat products to a deep golden brown that stimulates both palates and sales. Simple to operate, easy to clean. Automatic controls prevent smoking. Prepares 9 to 12 loaves per dip. Can also be used for gelatin and paraffin dips. Gas or electric.

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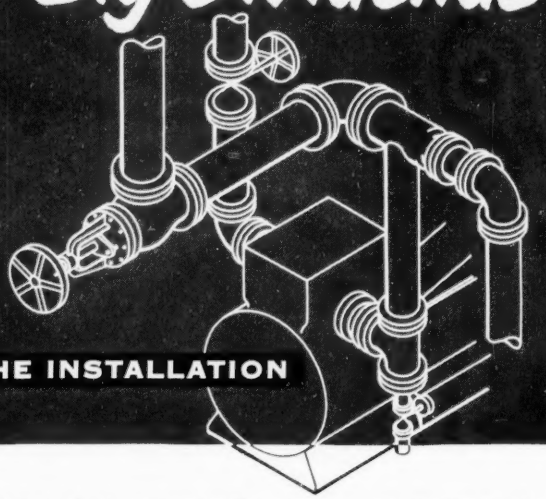
# Thrifty Valve Buying in 1918 Still Paying Big Dividends



**THE INSTALLATION**

At the American Crystal Sugar Company's Rocky Ford, Colorado, mill where Crane 12-inch iron body angle valves control carbon dioxide to pumps supplying the gas for carbonation process.

**VALVE SERVICE RATINGS**

**SUITABILITY:**
*Never failed in 35 years*

**FEATURES:**
*Simplified design—easy to service*

**MAINTENANCE COST:**
*None—Routine care only*

**SERVICE LIFE:**
*Installed 1918—still O.K.*

**OPERATING RESULTS:**
*Dependable $CO_2$ control*

**AVAILABILITY:**
*Crane catalog item—No. 353*

## THE CASE HISTORY

This $CO_2$ service requires valves of utmost dependability to protect process and equipment from damage. In the event of malfunction or failure of pumps, the valves must assure positive closure every time.

That's precisely the quality of performance Crane No. 353 valves have given in this service for more than 35 years. The mill's long inactivity between 75-day production campaigns hasn't made the job easier. Yet, these valves have never been out of the lines for repairs; they've remained on the job since 1918 with only routine maintenance.

Valves that set performance records like this aren't bought on price alone—it's quality that counts most. That's thrifty buying—still the only way of getting the best value.

## THE VALVE

You can see the ruggedness and serviceability of No. 353 angle valves, but it's what's inside that counts most in their better performance. Choose these valves from the complete family of Crane 125-pound iron body globes and angles. It gives you the widest selection of patterns and types for steam, water, oil, and gas. See your Crane Catalog or your Crane Representative.

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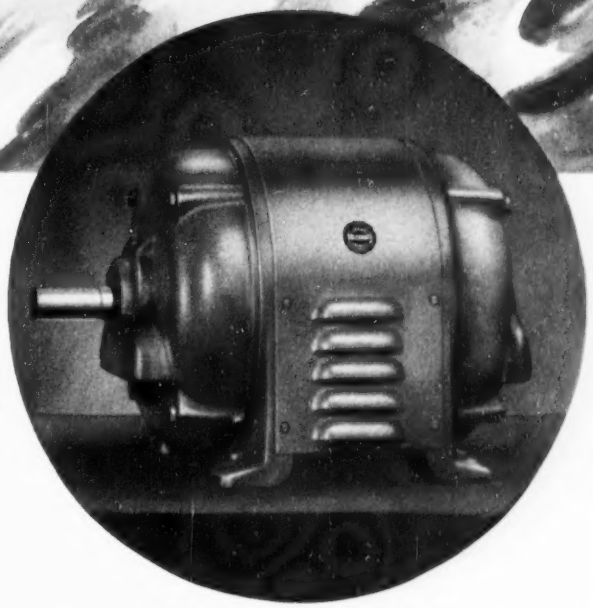
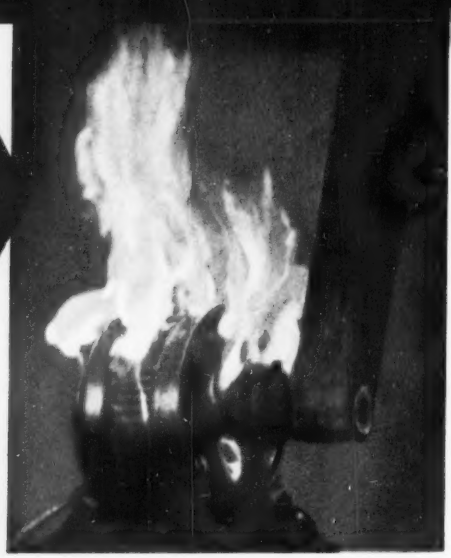
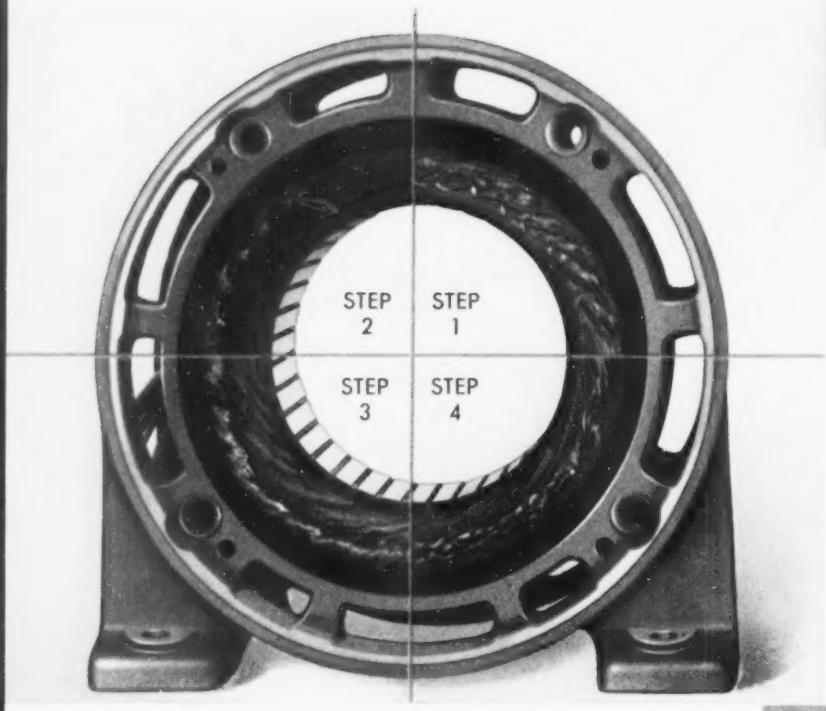


**U. S. MOTORS** ASBESTOS-PROTECTED

# Avoid this...






## INSTALL U.S. ASBESTOS PROTECTED MOTORS

## WINDINGS GIVEN MULTIPLE TREATMENT

Step by step, everlasting endurance is built into every U.S. motor by use of asbestos, the only natural fibrous element that cannot carbonize. Four progressive treatments of asbestic compounds are applied plus oven-baking, as follows:

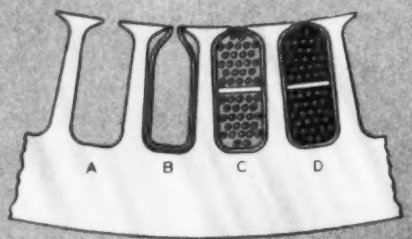
**STEP 1** — Synthetic insulated wire wound into coils and inserted in slots lined with sheet asbestos.

**STEP 2** — Complete stator is submerged in liquid asbestos insulating compound while pulsating current vibrates wires; then baked. A second dip and further baking follows.

**STEP 3** — Plastic asbestos compound is sprayed between and over all end turns, then baked to harden throughout.

**STEP 4** — Final spray seals pores; after fourth bake the surface contour is smooth.

### U. S. ASBESTIC PROCESS




**(A)—Empty stator slot before insulating and winding. (B)—Formed coil of asbestos providing a heat-proof wall of insulation. (C)—Cross section showing wires inserted, with asbestos coil covering entire winding. Asbestos plateboard in center of slot separating and insulating between coils. (D) Asbestoslac (in color) forced around windings, penetrates every interstice.**

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*Sales and Service offices in all principal cities.*

US MOTORS

## Fire Stopper

—Continued from page 77

this range is better than ± ½ deg. F., so a critical "danger" temperature could be set up that would trip its cam-operated mercury control switch and provide a warning. Actually temperature settled on is 185 deg. F.

The instrument measuring and recording action moves from house to house, printing a numbered record once each minute. And if the temperature exceeds 185 deg. F., an alarm bell rings and a red signal light shines.

Temperature "pick-ups" for the scanner consist of simple insulated thermocouple wires brazed together in pairs at one end to form a measuring junction. Couples are run from the instrument—one brought into each smokehouse and simply tied over the top of the trees to measure average temperature in the area.

At present this temperature scanner is hooked-up to survey six critical ham pit houses. However, we contemplate locating extra instruments on other equipment in the plant in the near future.

Already, the unit has paid for itself by giving warning about impending fires. These were quickly snuffed out. When its alarm system rings, the attendant quickly notes on the instrument's numbered chart record which house is critical, then takes protective measures. When the condition is remedied, a relay permits the alarm to be turned off, while the red signal light will continue to shine until the excessive temperature has dropped below 175 deg. F.

In addition, the scanner's chart record has proven an invaluable production tool inasmuch as it provides a complete time and temperature record of each batch. It has especially helped in the transition of work from shift to shift.

### Flame Monitors

Major hazard of the reconverted smokehouse is its burner system. We use a natural gas mixture with a potent Btu. rating, and loss of flame in a burner system for even a few seconds could easily mean a potentially destructive gas build-up.

To obviate this we have Brown Protectoglo combustion safeguard systems on each unit burner. In case of flame failure, this automatically stops flow of gas to the burner system.

Essentially, the Protectoglo consists of a metal rod, or flame electrode, that probes into the actual burner flame, and an associated electronic relay mounted nearby. When contacting fire, the flame itself completes the circuit between the electrode and one side of its relay. When the flame fails, however, this electrical circuit is opened and the relay de-energizes to the "off" position.

By connecting solenoid type valves to relay control terminals, shut-off of both pilot and main burner gas lines can be effected. In addition, an ignition transformer can be tied into the system to permit automatic relight of the burner system after a timed purging period.

In addition to the smokehouses, we also have combustion safeguards on our loaf bake-ovens and steam boilers in the engine room.

With this integrated system of fire protection—including our recently adopted sprinkler system and renovated fire doors. We figure on amortizing the whole program in four or five years.

Actually, however, those instrument safeguards are but a small fraction of this fairly costly program and well worth investigation by any safety-minded meat packer.

*End* (Resume reading on page 78)

## Morrell Packaging

—Continued from page 76

for 8-oz. sandwich spread and braunschweiger to retain top flavor over a prolonged period.

Surveys have also helped to bring order to our packaging program. Vacuum packaging, for example, was found to rate high with the consumer. Also transparent packages in general. So we have gone in heavily for this approach.

Vacuum packaging equipment has been limited to laminated cellulose-Pliofilm bags. However, with the development of proper gas-purge packaging equipment, saran should also come into its own for sliced luncheon meats. This should improve the shelf-life of these products markedly.

### New Layout

With the variety of packaging systems already on hand and some fairly orderly and definite ideas on how we wanted to employ this machinery and allied equipment, it was not too difficult to form a tangible plan for the number of packaging lines in the new, central facility.

However, the exact location of the area and its functional layout and design was something else.

Speed of product flow was essential. Our production of prepackaged meats is based on current sales, and we try to move orders, via reefer trucks and cars, to branches and retailers in minimum time. Hence, the area was spotted in a 50-by-80 ft. tiled in space, adjacent to the blast chill room and sausage holding cooler on the fourth floor of the sausage and table-ready meat building.

Handiness to the blast-chill room greatly speeds product through the new air-conditioned packaging area. Here, high velocity chilled air brings cooked and smoked items down to packaging temperature in 1 to 4 hr.

Product is moved on monorail-borne trees from the chill room to packaging, and similar mobile-trees bear the packaged product into a large adjacent storage cooler, where it may be held prior to shipping. An integrated washer (tunnel with sprays) accepts each tree after its loop through the packaging area and minimizes mold build-up.

Walls of the new area are ceramic tiled and cork insulated to the ceiling. York units, ceiling suspended, keep a steady, low-humidity 60-deg. F. atmosphere, which has proved best for handling of packaging materials.

### Lines in Action

Packaging lines in the new area are arranged in parallel and are served at their feed and discharge ends by the monorail system. About one-half of the floor area is taken up by wiener skinning and packing operations, the rest by three basic prepackaging lines.

Two long stainless steel skinning tables and two scale-ended double-deck table-top conveyors handle frankfurter and link sausage packaging. Wieners are overwrapped with clear cellophane and heat-sealed in a 12-oz. package. Six-pound cartons of wieners in natural casing are also packed at this station.

The three prepackaging lines consist of a Tee-Pak casing stuffing and dipping station, a triple-unit Cry-O-Rap line, and a dual unit Flex-Vac line supplied by a single Enterprise sheer-weigher-bagger.

A single unloading-scaling-stuffing table serves the three Cry-O-Vac packaging machines which, in turn, discharge onto a belt-conveyor that carries the sealed product bags through a Gordon-Johnson Shrink Dunker. One of the units is a "gooseneck" model of the hand-pull type. It is used primarily for loaves. The other two are automatic horizontal twist machines that handle ring items.

A thermoplastic label is now applied to the Cry-O-Rap bag. But we

## Meat Special

## Meat Special

are thinking of going to a printed bag. At present the throughput at this station is about eight items per machine per minute.

The two Flex-Vac machines that receive neat 6-oz. bagged slices of round and loaf items from the Enterprise unit will evacuate and seal six packages at a throw—in fact at a rate equal to the feeding speed of the operators.

Bags go into chambers of the machine, which pulls 28 in. of vacuum and automatically heat seals. Products handled include various loaves, cotto salami, sliced beef, all-meat bologna, and other sausage products. Capacity of the line is about 800 lb. per hr.

We also constructed a separate room for stuffing and packaging of fresh pork sausage. Like the new sausage packaging room, its walls are of ceramic tile and cork insulated. And again, ceiling-suspended York units maintain proper temperature.

One line in this room, which is adjacent to the manufacturing department, consists of a stuffer with dual horns for packaging of pork sausage in 1 lb. cellophane bags and also bulk packages. The other line comprises a stuffing unit, automatic linking machine, and table for packing link product in ½, 1, and 6-lb. packages.

Packaging lines were also added and rearranged in the smoked meat department. A Cry-O-Rap line includes two automatic horizontal twist machines with a single bagging table to serve both machines. A single conveyor carries the product, after packaging, through the automatic shrink dunker. Finished packaged product then goes in shipping containers.

Wrapping operations for hams and bacon were revised by our engineers to provide various stations for wrapping and scaling. A long belt conveyor now carries wrapped product to storage bins. Product is then removed from the bins and packed in shipping containers. Packed containers are moved to the loading department on another conveyor.

To improve our boned and rolled hams, a Rabinowitz Pressure-Pak unit (developed by Colonial Provision Co., Boston) was also secured, and the use of fibrous casings adopted.

Sliced bacon packaging was streamlined some time ago to include five Anco slicing machines and conveyors, four automatic heat-sealing machines for cellophane, and an automatic case sealer.

All finished packages are inspected by the packers, and samples are collected at random for checking by the quality control department.

We plan to keep pace with the fast growing developments in the field of packaging machines and various packaging films for the prepackaging of meats. Consequently, our packaging lines are laid out so any new developments we decide upon can be implemented smoothly.

*End* *(Resume reading on page 77)*

## Electrostatic Smoking

*—Continued from page 71*

the ionized smoke field can vary. But it is essential that a good system of grounding be employed on the conveyor so that the product is at negative potential. Because this method of smoke deposition is almost instantaneous, it may be possible to move the product continuously past a smoke area on trees, or even on moving belts.

One thing is certain. The fact that much smaller quantities of smoke are needed per unit of product, plus the fact that much closer control of deposition can be exerted in a given time period, should cause packers to critically eye the shortcomings of present day conventional systems. And needless to say, some interesting departure in the mechanics of this ancient art soon will be the order of the day.

But a word of caution to interested packers who have not "gotten their feet wet" as yet in this new endeavor. There are many problems associated with the simple act of electrostatic smoking which complicate the crystal-clear benefits of the process. True, these are being solved by workers in the field. But the stage of "above-board" information needed to speed you in the project has not yet arrived.

In other words, companies now smoking electrostatically have developed their know-how the "hard-way" and are understandably prone to keep results to themselves for the time being.

### Coating—Clarification

In its coating applications (see page 71) electrostatics may bring certain universal benefits. It should drastically conserve the coating material by expediting thinner and more uniform coats. And it should decidedly improve mechanics of the operation due to its inherent speed of action.

Finally, another intriguing use is suggested—an offshot of the deposition of solids from aerosols. It is the precipitation of solids from liquids by an applied electrical potential. In one such installation, suspended solids are completely removed from an organic liquid by simply passing the slurry through a high-voltage grid in a pipe section. The suspended particles are then collected in a grounded area of the pipe on a removable pan.

So the unit operation of clarification, as well as deposition, can well be added to the list of "things to come" for electrostatics in the food field.

Nevertheless, the power supply used should be designed to automatically shut itself off when an overload of any sort occurs. Further, its design should be such that its maximum current will be in a safe range even should these protective devices fail.

One of the engineering developments which has helped to make such high-voltage equipment portable and inexpensive is the voltage-doubler circuit. In this, voltage is generated across two capacitors in series, one half of one cycle of alternating current charging one capacitor, and the other half the remaining capacitor. Hence, voltage output is the sum of voltage across these two capacitors.

The above gain means that power supply components need only be rated at one-half the required output voltage and represents a considerable saving in both cost and size.

### Working Installation

In actual experimental smoking installations, a Beta Electric power pack has been used to develop the necessary high-voltage. This unit is very compact, operates from an ordinary electrical wall outlet, and can be mastered by an average person in a few minutes.

The Beta unit is mounted on casters and occupies about 2 sq. ft. of floor space. It is divided into two sections. Its lower half—the rectifier part of the system—consists of a 22-in cubical steel tank filled with transformer oil. Mounted in this are the step-up transformer and rectifier tubes, as well as other necessary components.

A control cabinet about 30 in. high comprises the upper section. On its face are "On" and "Off" switches, voltage and current dials, and a calibrated knob adjustment for voltage output. Pilot lights indicate functioning of the various circuits.

Physical set-up of the smoking area will depend on existing conditions and ingenuity of the processor. Some kind of smoke generator will, of course, be employed. And means will be arranged to funnel or channel its output through an ionizing structure, standard metal grids being available for the purpose. The latter is charged through a clamp cable from the power-pack and is well insulated from supporting structures.

How the meat is moved through

*End* *(Resume reading on page 72)*

another FIRST!

Josam Series JH

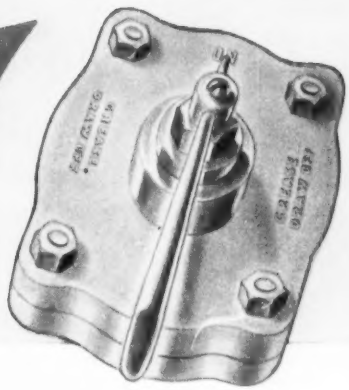
NEW SENSATIONAL

# GREASE INTERCEPTOR

with the greatest feature ever offered!

**Designed on a New Principle that**

Automatically draws off GREASE at the turn of a valve!



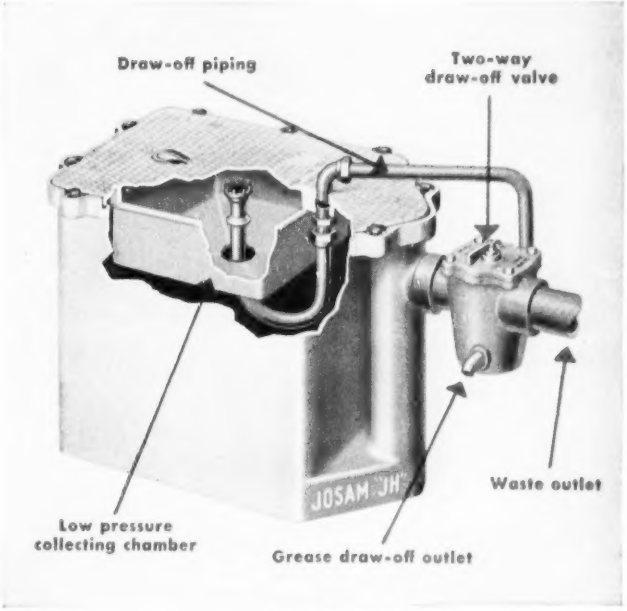
- *no longer necessary to take off cover to remove grease*
- *no longer necessary to remove grease from interceptor by hand*
- *grease flows out of draw-off... no inconvenience...no odors...no mess*

Here is the grease interceptor the industry has long awaited—a grease interceptor that AUTOMATICALLY discharges the grease at the turn of a valve, eliminating the inconvenience of removing the cover of the interceptor and cleaning out the grease by hand.

In the new Josam Series "JH" interceptor with a specially designed "low pressure" or "partial vacuum" chamber, the grease continues to collect in the low pressure chamber from which it can be drawn off at any time, without removing the cover, simply by turning the handle of the draw-off valve at outlet end of the interceptor to the "draw-off" position.

After the stored grease is drawn off, the valve is turned to "on" position and the interceptor is back in operation for grease interception.

Available in a wide range of sizes. Send coupon today for complete information.

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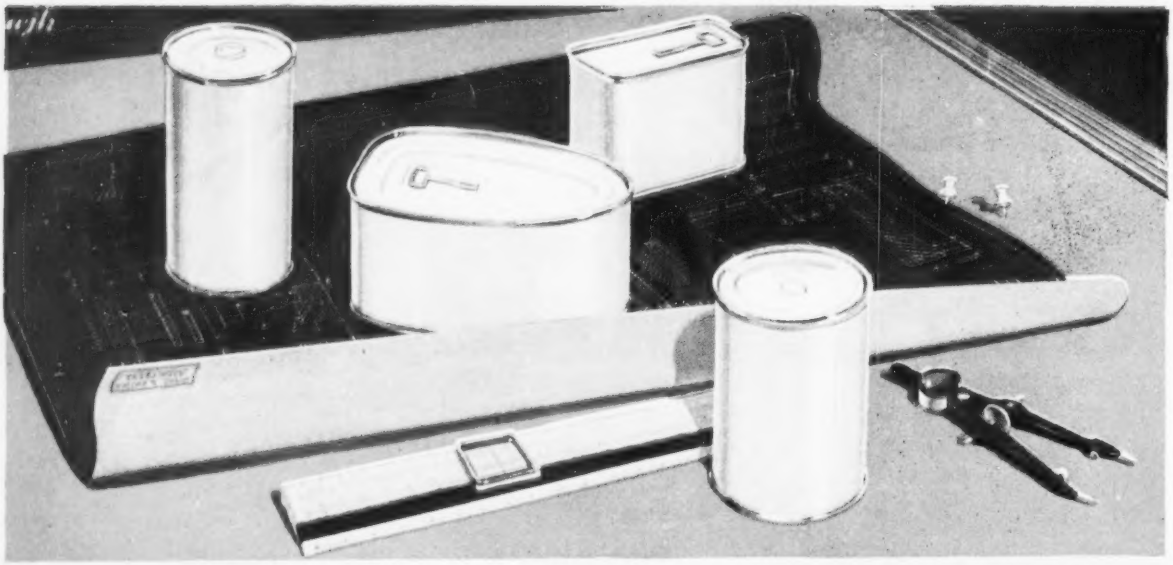

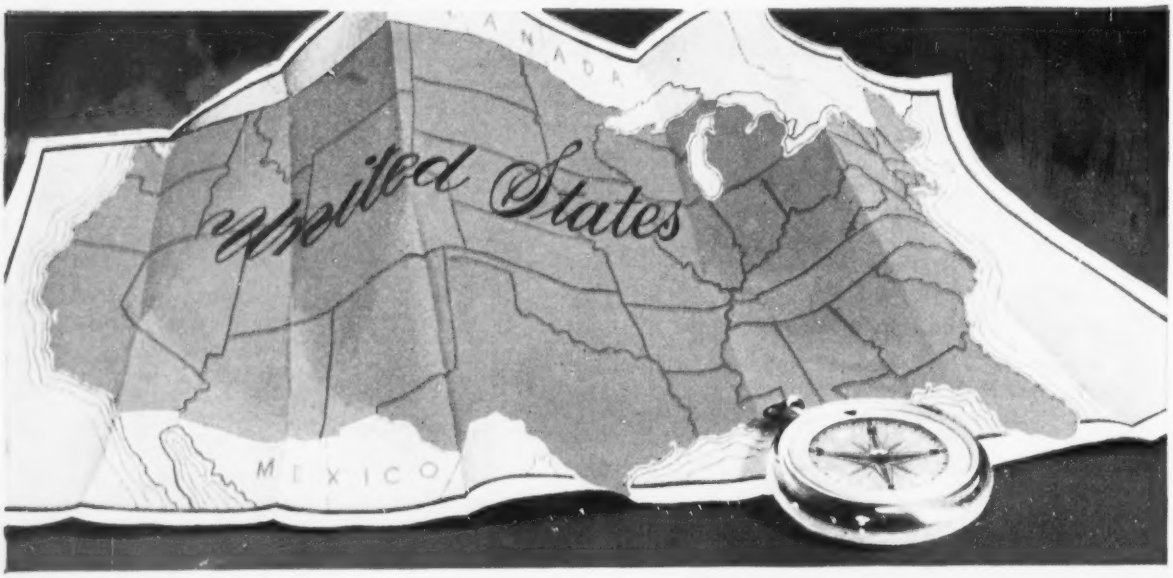
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**Take the simple word,** "Ability." When a supplier *has* that—*plus* enterprise and foresight—it becomes an even more important word: "Availability."

Time after time, since the turn of the century, manufacturers have come to Canco wanting new and different types of packages for new and different types of products. Time after time . . . we've been *ready* with the answer.

For Canco doesn't wait to be asked. We are constantly striving to improve the methods and materials we use to help customers and prospective customers market their products more profitably.

In short, no other organization can match Canco's *combination* of people, conveniently located plants, research, technical assistance, delivery service, quality and experience. As a result, you get *what* you want . . . *where* you want it, and *when!*

That's why it's just plain common sense to

## ← What you want...

## ← Where you want it...

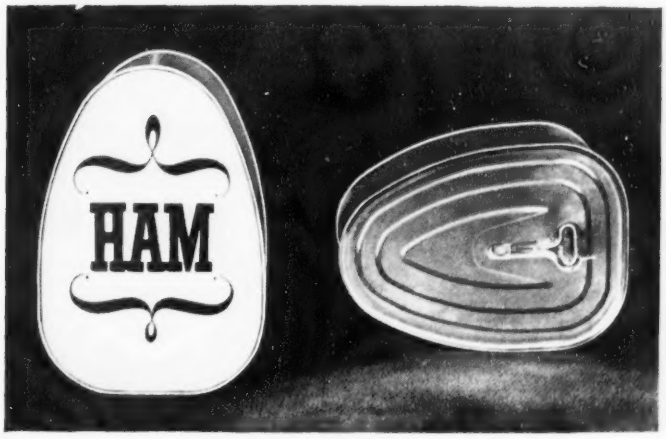
## ← and when!

***Go first to the people who <u>are</u> first!***

# AMERICAN CAN COMPANY

CANCO

New York, Chicago, San Francisco; Hamilton, Canada




This new "Small-Family" package—the #1 Base Ham Can, with a capacity of three to four pounds—opens up a profitable market for American packers.



For more information, use coupon on page 157.

# RADIO

## protects perishables from grove to market!

G-E 2-way radio serves Patrick Fruit Corp. in a variety of ways. Here, G. M. Judah, a grove foreman, shifts field crews to fill an order received minutes earlier.

### G-E 2-Way Radio sets the pace for picking, processing and marketing fruit!

ADD up the full value of coordinating Patrick Fruit Corporation operations at Sanford, Florida, and you'll find the reason why Vice-President Dan Wright says: "We don't know how we got along without General Electric 2-way radio!"

A G-E communications system keeps picking crews instantly available . . . paces their output . . . prevents over-picking. Lab reports are relayed in seconds—marketing and weather problems easily overcome—by radio! Delivery of a maximum yield—fully-ripened and approved—is assured! Improved processing and packaging efficiency raises profit even higher. Trucks for market transport are *always under control* . . . "Deadheading" almost eliminated.

Translate all the *benefits* of radio *to your plant* and then take advantage of superior G-E equipment for outstanding performance . . . long-life . . . low-cost maintenance in every installation!

**Invite The G-E CAS* Man To Call!**

For complete information on G-E industrial radio communications equipment, call our local office today or write: *General Electric Company, Section 7093, Electronics Park, Syracuse, New York.*

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# ENGINEERING

JET APPARATUS • HEAT TRANSFER EQUIPMENT • STRAINERS • CONDENSERS AND VACUUM PUMPS • OIL BURNING EQUIPMENT • ROTAMETERS • FLOW INDICATORS • RADIAFIN TUBES • VALVES • SPRAY NOZZLES AND ATOMIZERS • GEAR PUMPS • DESUPERHEATERS

# HERE'S A PUMP WORTH LOOKING INTO!

## and, the best way to do it is to ask for a copy of NEW BULLETIN 17-A

If you want a well engineered, well built, genuinely efficient pump for handling materials ranging from molasses to edible oils to gelatin or other materials with viscosity ranges from 30 to 10,000,000 S.S.U. . . . or, if you need a pump to operate within capacities from 1 gph to 1000 gpm, depending on the fluid . . . or a pump built for operating against pressures up to 3500 psi . . . one of the line of Gear Pumps offered by SK can be made to meet your requirements.

Just to *tell* you that these pumps have earned a fine reputation in the Food and Food Processing industries, as well as many other fields, isn't enough, we know. You want to know the whys and wherefores, and these aren't easy to explain in limited space.

Briefly, however, one of the outstanding contributing factors to the *efficiency* of these pumps lies in the fact that SK engineers can use selected materials—modify design and construction—to fit the application. Or, if the job warrants it, SK engineers will design a new model to give you what you want.

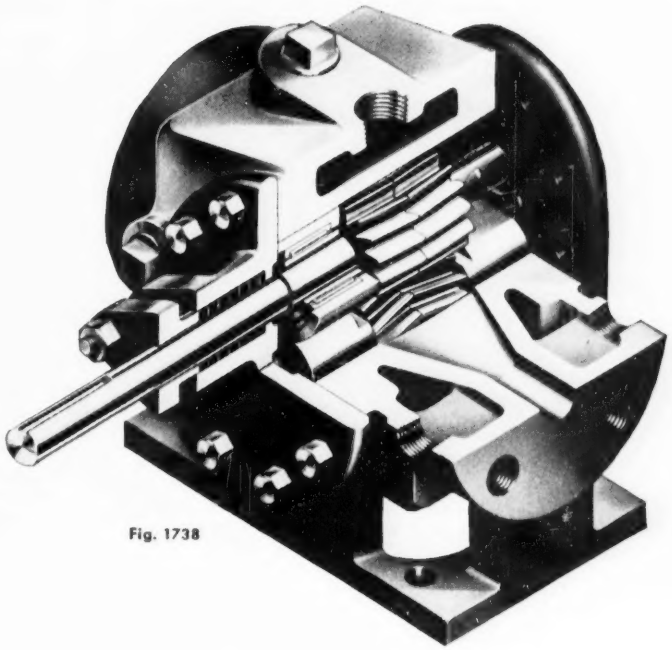
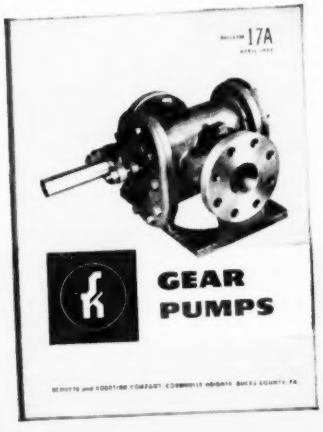


Fig. 1738




You can get many facts on our line of Gear Pumps from our new Bulletin 17-A. It's filled with details on: how these pumps are designed and constructed; how they are used in practically every processing field; how you can select the proper pump to meet your specs. Cutaway drawings, installation photos, tables of capacities, dimensions, operational data are included to better acquaint you with a type of pump which may be *just right* for you.

Send for a copy of Bulletin 17-A to the address below.

**SCHUTTE and KOERTING Company**

**25 STATE RD., CORNWELLS HEIGHTS, BUCKS COUNTY, PA.**

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# Huron HVP

HYDROLYZED VEGETABLE PROTEINS

## adds a *Flavor*

## like the broth from well browned beef

Huron HVP (Hydrolyzed Vegetable Proteins) produced from pure wheat gluten, have a flavor like that of the broth from well browned beef — a distinctly meaty taste useful in strengthening and extending the flavor of many foods—particularly in soups, gravies, sauces, etc. and in adding flavor to processed meat products.

For convenience and ease in use, Huron HVP are available in three different styles—in liquid, paste and powdered forms. The cost of all three forms is so small as to make them a practical ingredient for increasing taste appeal.

*For full working sample and technical advice on use in specific food products, write to Technical Service Department at any of the following addresses—*

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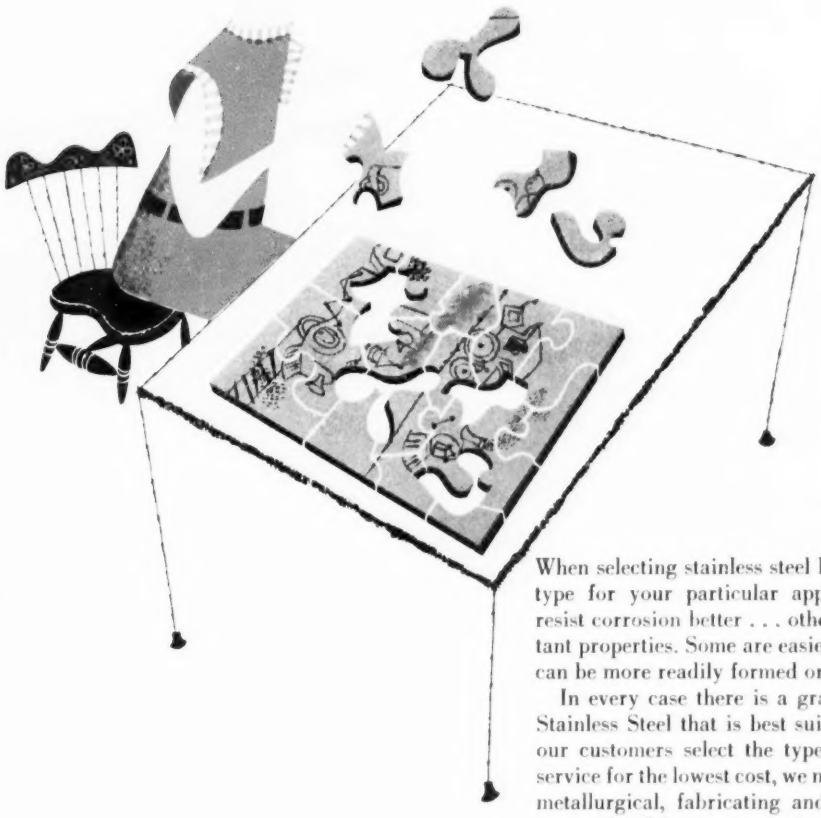
# pick the stainless that fits best



When selecting stainless steel be sure you pick the correct type for your particular application. For some grades resist corrosion better . . . others have superior heat resistant properties. Some are easier to machine . . . still others can be more readily formed or welded.

In every case there is a grade of Crucible REZISTAL Stainless Steel that is best suited to the job. And to help our customers select the type that will provide the best service for the lowest cost, we make available all the design, metallurgical, fabricating and application data we have accumulated in our years of stainless steel experience with many different industries.

Our staff of field representatives brings you the benefit of our vast technical resources. And the quality of REZISTAL Stainless Steel sheets, strip, plates, bars, wire, forgings, castings and tubing produced in our modern integrated mills is unsurpassed in the industry. When you have an application for stainless, call Crucible.

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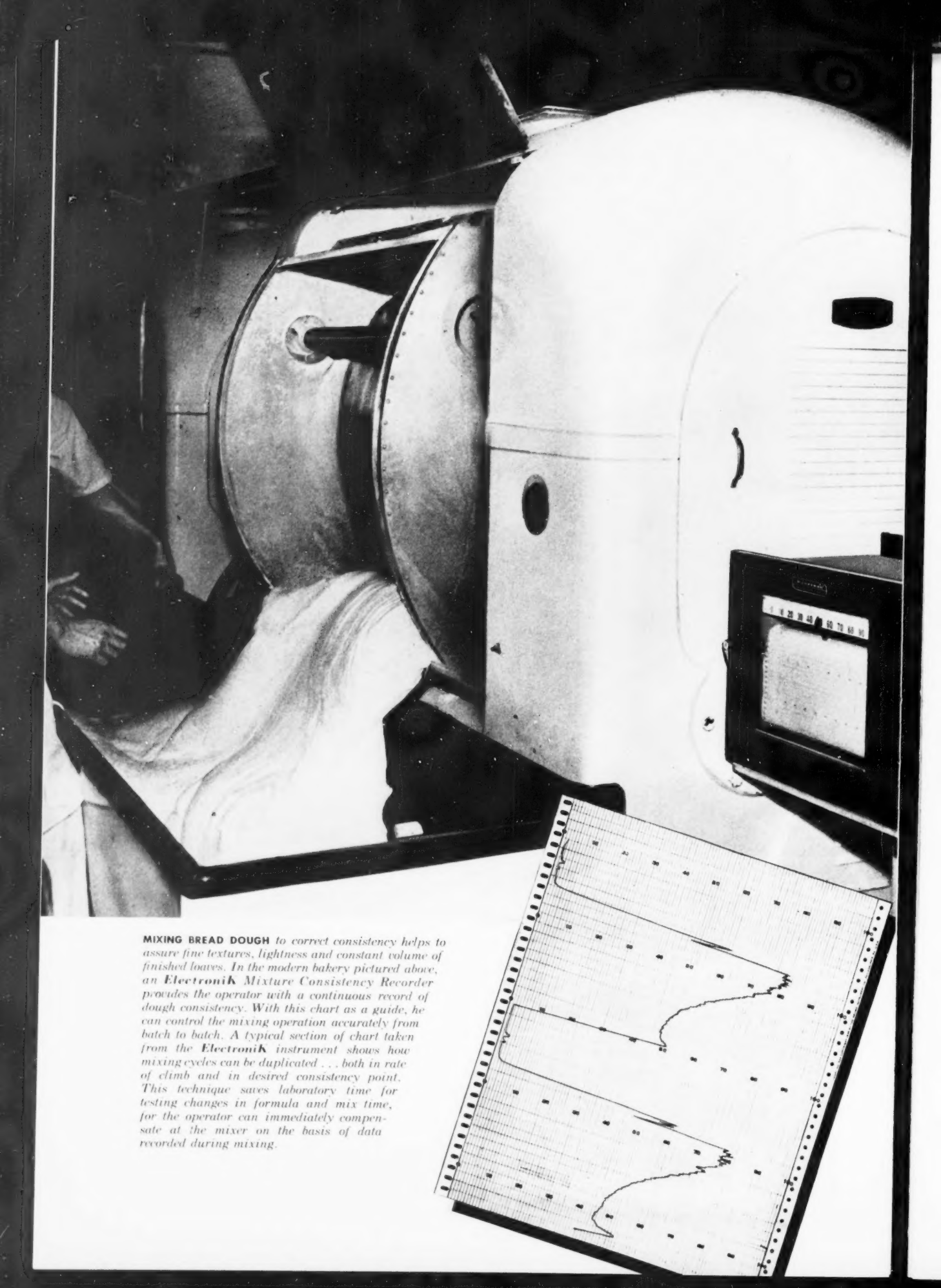
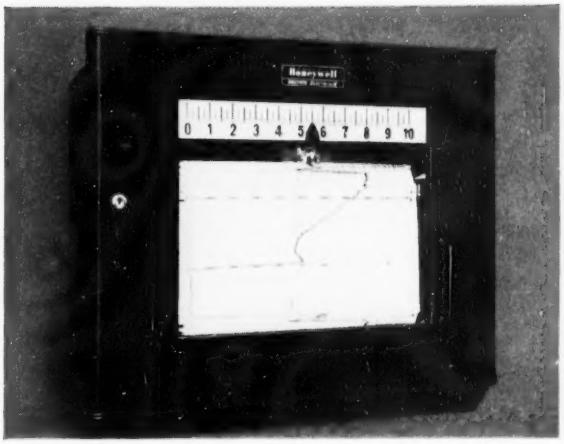


**MIXING BREAD DOUGH** *to correct consistency helps to assure fine textures, lightness and constant volume of finished loaves. In the modern bakery pictured above, an* ***ElectroniK*** *Mixture Consistency Recorder provides the operator with a continuous record of dough consistency. With this chart as a guide, he can control the mixing operation accurately from batch to batch. A typical section of chart taken from the* ***ElectroniK*** *instrument shows how mixing cycles can be duplicated . . . both in rate of climb and in desired consistency point. This technique saves laboratory time for testing changes in formula and mix time, for the operator can immediately compensate at the mixer on the basis of data recorded during mixing.*

# *For better control of mixing processes...*

## the new *ElectroniK* Consistency Recorder




IF YOU have a problem of mixing a product to desired consistency, here's a new idea in control that may prove useful. It's the *ElectroniK* Mixture Consistency Recorder . . . which continuously measures and records the consistency of the material you're working, by using a novel technique of instrumentation.

Its basic principle is extremely simple: it measures the power required to drive the mixing machine's motor. As the consistency of the product increases, the mixer motor draws more power. Input to the motor is thus related directly to product consistency. Whereas direct measurements of consistency are often difficult or uncertain, this technique affords a sensitive, readily reproducible qualitative index to the variable.

It gives the operator a reliable guide for supervising the mixing process . . . shows up abnormal variations, and tells him when processing is completed. And it provides management with an automatic production chart that points out intervals between batches, shows shutdowns and loading and emptying times.

Instrumentation consists of a specially designed *ElectroniK* strip chart potentiometer, which works in conjunction with a Thermal Converter Unit to record electric power consumed by the mixer motor. Your local Honeywell sales engineer will be glad to discuss how this new idea can improve control of your mixing operations. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4502 Wayne Ave., Philadelphia 44, Pa.

● **REFERENCE DATA:** Write for your copy of new Data Sheet, 3.6-7, on the *ElectroniK* Mixture Consistency Recorder.

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*First in Controls*

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Protects foods in storage . . .

Gives long service . . .

Guards against heat flow . . .

# No wonder ROCK CORK is the No. 1 insulation for cold rooms, equipment and piping!

Not just another insulation, *but a many ways better insulation*, Rock Cork has long been the first choice of leading refrigeration engineers.

Rock Cork brings you the excellent insulating qualities of mineral wool, plus the added protection of a moisture-resistant asphaltic binder. Because Rock Cork is basically mineral in composition, it is immune to vermin and mold-growths . . . an extremely important advantage wherever odor-sensitive foods are stored.

Rock Cork is produced in sheet, lagging and pipe insulation forms in standard sizes and thicknesses. Rock Cork Pipe Insulation has the additional protection of an asphalt-saturated asbestos felt jacketing which also speeds installation by reducing the need for seam filling.

**Skilled applicators protect your investment!** For maximum efficiency, insulation must be installed correctly. Be sure that you get the most out of your insulation dollar by calling in a Johns-Manville insulation contractor. For the name of the one nearest you, write Johns-Manville, Box 60, New York 16, N. Y.

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**Folder IN-122A contains property tables and other important reference data on Rock Cork's advantages. Send for it today!**

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**REFRIGERATION INSULATION**

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*help Sherwin-Williams cover the earth*

Sherwin-Williams, one of the best known names in the paint industry, is shipping S-W paints in colorful Rheemcote lithographed 55-gallon drums, to make the company name and trade-mark even better known.

Rheemcote containers can be lithographed in any number of colors, any design, including halftones. The high-gloss finish is tough, long-lasting. When necessary, interiors can be roller-coated with special protective lacquers.

If your product is shipped in steel containers, let Rheem show you the way to added prestige and profit . . . with Rheemcote Poster Drums.

Write for free colorful booklet on this powerful new advertising medium. Rheem Manufacturing Company, 4361 Firestone Boulevard, South Gate, California.

*Sell as you ship with* **Rheemcote drums**

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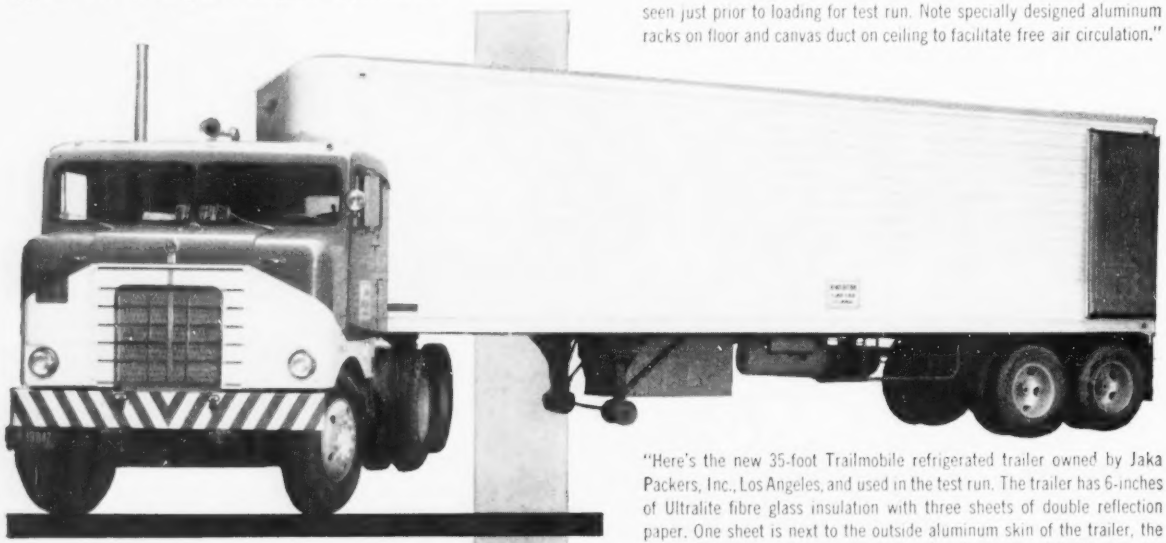
# "...we are highly pleased with the results of this test..."

"Working with the U. S. Dept. of Agriculture we conducted a transcontinental test run on the handling of frozen orange juice, and I can now say we are highly pleased with the results of this test, using a 35-foot Trailmobile semi-trailer refrigerator van," reports Mr. J. A. Podmore, General Traffic Manager, Minute Maid Corp., Plymouth, Fla.

"Carrying 1500 boxes of orange juice (approx. 35,000 pounds) the 6-inch insulated Trailmobile running from Plymouth, Florida to Los Angeles, California, in five days, delivered the cargo at temperatures *below* those when the cargo was originally loaded. See the day-by-day log showing temperature variations at lower left."

This controlled test confirms the performance that's quality-engineered into every Trailmobile. This reefer van is one of a wide variety of models built to meet any hauling need. Call your friendly Trailmobile Branch Office for full information on the type that's best for your transport requirements.

"Trailmobile refrigerator van insulated with 6" of Ultralite all around is seen just prior to loading for test run. Note specially designed aluminum racks on floor and canvas duct on ceiling to facilitate free air circulation."



"Here's the new 35-foot Trailmobile refrigerated trailer owned by Jaka Packers, Inc., Los Angeles, and used in the test run. The trailer has 6-inches of Ultralite fibre glass insulation with three sheets of double reflection paper. One sheet is next to the outside aluminum skin of the trailer, the second is sandwiched between the two 3-inch layers of Ultralite and the third sheet next to the inside walls of marine plywood. The ceiling and doors are similarly insulated, the doors having triple rubber seals. The bottom of the Trailmobile has similar insulation under aluminum extruded flooring. Vertical wooden battans are spaced 12" apart along sides to insure adequate vertical circulation. Special 2" high aluminum floor racks give cold air circulation for bottom load. Mechanical refrigeration was employed using a Transicold 1R-101 transport unit."

## TRAILMOBILE-TRANSICOLD LOG

Plymouth, Florida—Los Angeles, Calif. Test Run
(citrus concentrate)

| Date | Location | Time | Box Temperature | Ambient |
|---|---|---|---|---|
| 12-4 | Plymouth, Fla. | 3:30 p.m. | plus 50 | 65 |
| 12-4 | Plymouth, Fla. | 4:15 p.m. | minus 4 | |
| 12-4 | Orlando, Fla. | 5:00 p.m. | | |
| 12-4 | Ocala, Fla. | 11:00 p.m. | minus 20 | 55 |
| 12-5 | Ocala, Fla. | 8:00 a.m. | minus 20 | 58 |
| 12-5 | Bainbridge, Ga. | 4:00 p.m. | minus 20 | 72 |
| 12-6 | Selmer, Tenn. | 9:45 a.m. | minus 24 | 50 |
| 12-6 | Little Rock, Ark. | 2:30 p.m. | minus 23 | 65 |
| 12-7 | Dallas, Texas | 3:30 a.m. | minus 24 | 50 |
| 12-7 | Dallas, Texas | 2:20 p.m. | minus 25 | 70 |
| 12-8 | Las Cruces, N. M. | 11:00 a.m. | minus 19 | 65 |
| 12-8 | Lordsburg, N. M. | 2:45 p.m. | minus 20 | 72 |
| 12-9 | Los Angeles, Calif. | 7:30 a.m. | minus 20 | 55 |
| 12-9 | Los Angeles, Calif. | 10:30 a.m. | minus 20 | |

T/M TRAIL-MOBILE

*The Trend is to* **TRAILMOBILE**

PULLMAN

**TRAILMOBILE** INC.

CINCINNATI 9, OHIO — BERKELEY 10, CALIFORNIA

*Friendly Sales and Service from Coast to Coast*

## ACTION UNLIMITED—

# THANKS TO BATTERY POWER!

Modern battery-powered industrial trucks have higher lifts, greater maneuverability, shorter turning radii and interchangeability of attachments necessary to meet today's material handling needs. Batteries for these versatile units have kept pace with progress, too. Greater ampere hour capacity gives them unlimited action all day long, without letdown. And remember—only battery trucks are silent, safe and fume-free. For industrial trucks, there's *no* power like Gould Battery power.

Visit us at the National Industrial Packaging and Materials Handling Exposition, Boston, October 20 to 22, Booth 317.

Specify
THE GOULD "THIRTY"—
America's Finest
Industrial Truck Battery

## GOULD INDUSTRIAL BATTERIES

**GOULD-NATIONAL BATTERIES, INC.,** TRENTON 7, N. J.

*Always Use Gould-National Automobile and Truck Batteries*

©1953 Gould-National Batteries, Inc.



For more information, use coupon on page 157.

Circulating conditioned air evenly throughout the smokehouse is a problem.

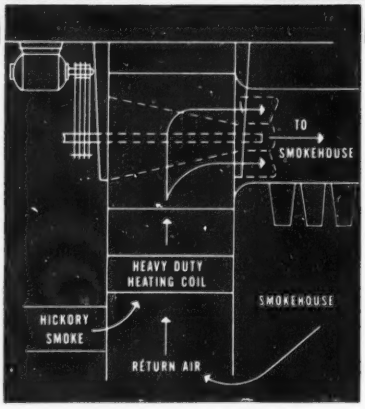
# HOW TO "SMOKE OUT" HIGH OPERATING COSTS IN A SMOKEHOUSE

The circulation of conditioned air, so necessary for smoking meats, has always been a problem. Tars accumulating on the fans and heating coils cut capacity, thus slowing down production. The necessary maintenance further increases operating costs, but not any more.

Armour and Company knew they needed a fan that would keep belts and bearings outside of the air stream. The housing had to be so shaped that it would not collect tars. The steam heating coil had to be sturdy, easily cleanable, and efficient.

Engineers of Armour and Westinghouse teamed up—decided on Westinghouse Elbow Axiflo® Fans and Heavy Duty Steam Coils built entirely of steel. This was the answer to this involved problem. The fans and coils fill the bill so well that they have now been put into service at 16 Armour smokehouses.

Some day you may have a problem that involves *putting air to work*. When you do, remember that Westinghouse has the most complete line of air handling, air cleaning and air conditioning in the industry. Ask for new Catalog 600. It contains 60 fact-filled pages on these products, and how they can put air to work for you. For your free copy, call your local Westinghouse-Sturtevant office. Or, write to Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Mass.




**HOW A SMOKEHOUSE IS "SMOKED"**

Hardwood smoke is drawn into the system and mixed with return air from the smokehouse. This mixture next passes over a heating coil to bring it to the proper temperature. An Elbow Axiflo Fan then turns it 90° into ducts which feed the discharge nozzles.

Note how fan motor, bearings and belts lie outside the air stream. This keeps them free of hazardous tar and heat, and makes them easy to maintain. The fan and coils are accessible, and all-steel construction withstands alkali cleaners.

YOU CAN BE SURE...IF IT'S

**Westinghouse**

AIR HANDLING

J-80284



For more information, use coupon on page 157.

## Schoettle Case Histories:

true story of a

# Purchasing Agent in a Lather

**CASE HISTORY #39** The 200,000 folding paper boxes that this company* ordered were ready—and then the Purchasing Agent phoned. He was really in a lather! A raw material used in the manufacture of the product became suddenly unavailable and the boxes were useless. What could we do about it, he pleaded. We resold these boxes to another customer at no loss to the manufacturer for whom they were originally made. We work hard to get customers. We work hard to keep customers, that's why purchasing agents love us!

**CASE HISTORY #62** A large electric supply company* required an original construction of a folding paper box in which to ship bolts, nuts and screws; and also provide a dispensing bin on the shelf. The purchasing agent worked himself into a lather trying to figure out a box that could do a "complete" job. Half a dozen manufacturers submitted "Goldbergs" that were totally impractical. Finally he did what he should have done immediately—call on Schoettle. In short order, Schoettle produced a box that was praised very highly and the Purchasing Agent relaxed and smiled again.

• Whether it's speed or ingenuity, depend on Schoettle to produce! We specialize in "unlathering" purchasing agents . . . we never let them down! For quality folding paper boxes—as you want them—when you want them, depend on Schoettle!

*name on request

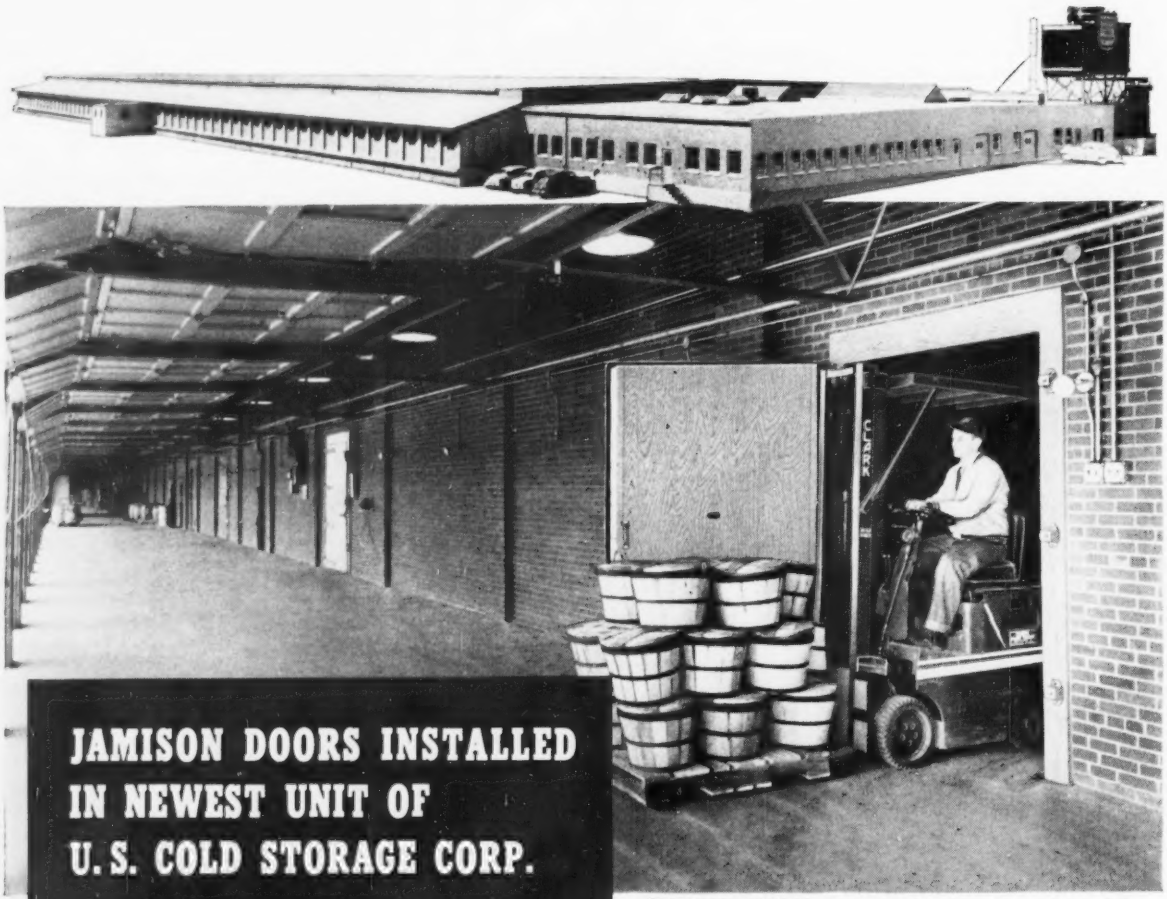
**EDWIN J. SCHOETTLE CO.**

533 NORTH ELEVENTH STREET • PHILADELPHIA 23, PENNA.

Designers and Manufacturers of Paper Boxes with Buy Appeal




For more information, use coupon on page 157.



# JAMISON DOORS INSTALLED IN NEWEST UNIT OF U. S. COLD STORAGE CORP.

*FORK-LIFT TRUCKS permit rapid movement in and out of the cold storage rooms along this loading dock.*

The U. S. Cold Storage Corp. has equipped its splendid new Omaha plant entirely with Jamison modern Series "50" Cooler and Freezer Doors. This new warehouse combines the latest in design, methods and equipment. It has 2,000,000 cubic feet of refrigerated space and a storage capacity of 25,000,000 pounds.

Jamison's exclusive hardware and rigid box-girder construction stand up under the heaviest punishment of electric truck operation. At this installation, the Series "50" doors meet a wide range of storage requirements. The 5-by-8-foot opening permits faster and easier handling by lift trucks.

There are 26 Jamison doors in the warehouse. Twenty-two open onto the loading dock with eleven on the track dock and eleven on the truck dock. Request Catalog No. 3 for details and specifications. Jamison Cold Storage Door Co., Hagerstown, Md., U. S. A.

*THESE UNUSUALLY WIDE doors permit rapid movement of heavy loads by means of hand trucks as well as electric trucks.*

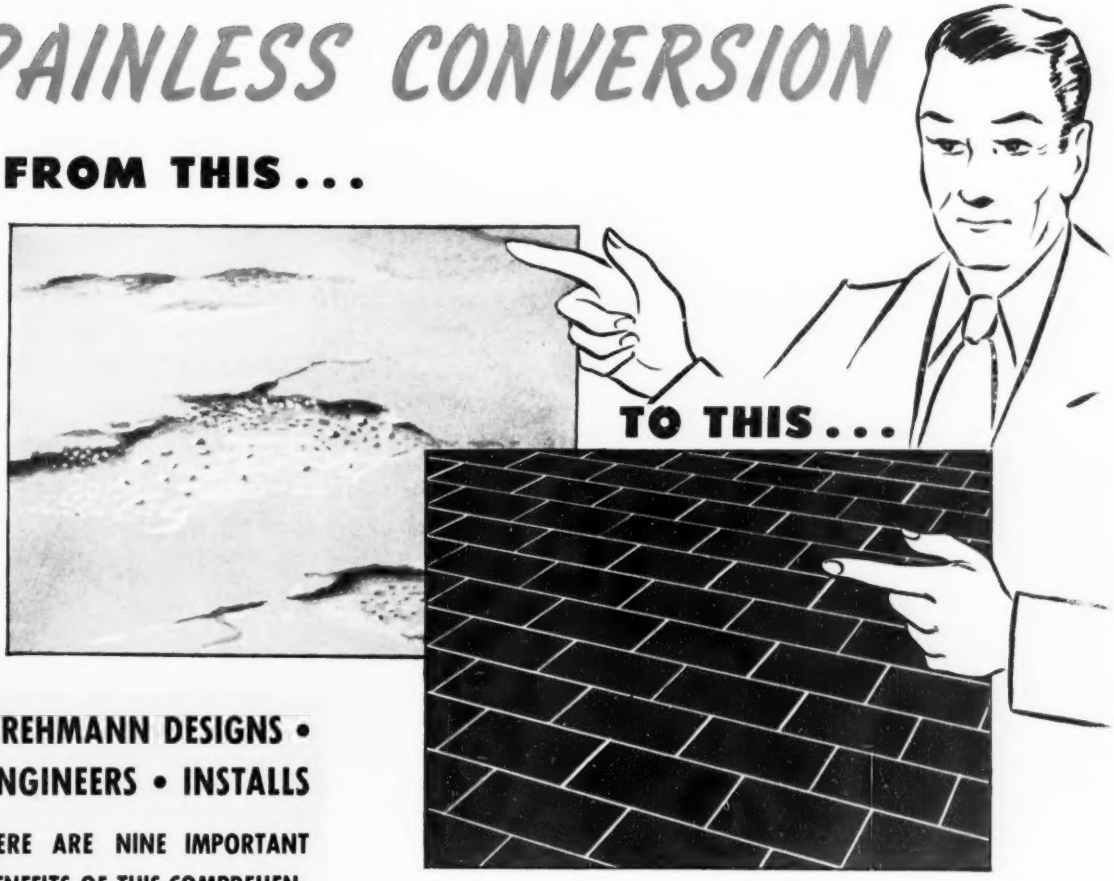
**JAMISON**

**HAGERSTOWN, MARYLAND, U. S. A.**

***THE LEADER FOR OVER FIFTY YEARS***

# PAINLESS CONVERSION

**FROM THIS . . .**




## DREHMANN DESIGNS • ENGINEERS • INSTALLS

**HERE ARE NINE IMPORTANT BENEFITS OF THIS COMPREHENSIVE FLOOR SERVICE**

- Handsome appearance
- Excellent sanitary properties
- Resistance to acids and alkalies
- Extreme durability
- Faultless drainage
- Easy to clean
- Low cost maintenance
- Freedom from vermin
- Long life

*Write our nearest office for Bulletin = A-1 "New Construction and Modernization."*

## while plant operated *FULL BLAST!*

It's a fact. Without sacrificing production for a single day, your floors can be converted to long-life, trouble-free Sani-Brick.

No shut-down. No slow-down. No interference. A highly successful installation method* enables Drehmann to lay sparkling new Sani-Brick right over your old worn floors while your plant operates at capacity.

If your present floors are worn, cracked or rotted . . . if sanitary conditions are way down and operating costs way up . . . then it's time for corrective action. Don't throw good money after bad by patching and repairing. Instead, call in a Drehmann engineer and let him tell you how this organization can solve your problem once and for all—and save you money in the bargain.

**So smooth* and efficient is Drehmann's method of installation, this organization is constantly being called upon for conversions by blue ribbon industries.

**DREHMANN PAVING & FLOORING CO.**
*ORIGINATORS OF BRICK FLOORS • ESTABLISHED 1869*
Gaul and Tioga Sts., Philadelphia 34, Pa.
5737 S. Halsted St., Chicago 21, Ill.
3757 Wilshire Blvd., Los Angeles 5, Cal.

DREHMANN HAS THE FLOOR FOR MODERN INDUSTRY

**DREHMANN**
SANI-BRICK FLOORS

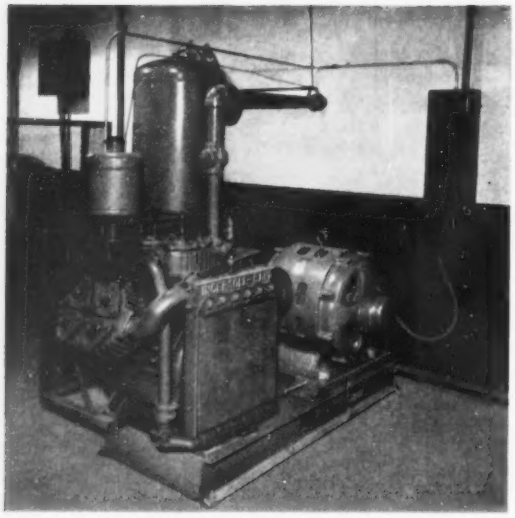


For more information, use coupon on page 157.

## from 1/2 to 100 hp

# I-R AIR-COOLED COMPRESSORS

## give you these important advantages

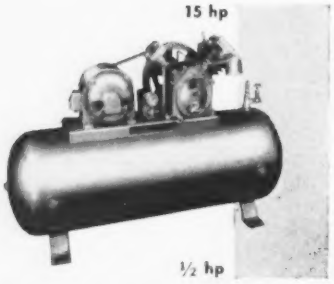


*This 50-horsepower V-belt driven Type 40 compressor supplies air in an abrasive-manufacturing plant.*

- **SMALL FLOOR SPACE**
- **NO SPECIAL FOUNDATION**
- **EASY MOVABILITY**
- **NO COOLING WATER REQUIRED**
- **NO WATER PIPING**
- **NO DANGER OF FREEZING**

● Wherever compactness and light weight, low installation and operating costs, dependable service, and minimum attendance are important factors, Ingersoll-Rand air-cooled compressors fill all the requirements.

Their wide acceptance by all types of industry—from mines to power plants—from drug manufacturers to cargo ships—proves their versatility and dependability. For main air supply, for supplementing the capacity of larger compressors or for de-centralized air systems, Type 30 and Type 40 compressors are ideal. Your nearest I-R representative will be happy to apply his knowledge and experience to your particular problem.




790-1

**Type 40** Compressors are two-stage, air-cooled . . . sizes from 25 to 100 hp. Discharge pressures from 80 to 125 psi, also up to 200 psi. . . . Three types of drive: "Motor-compressor," with built-in electric motor; flexible coupled; or V-belt driven. Durable, efficient Channel Valves, Timken tapered-roller main bearings and Constant-level lubrication are additional features. Dual-Control permits selection of constant speed or automatic-start-and-stop control.

**Type 30** Compressors come in sizes from ½ to 15 hp . . . handle smaller volumes of air at pressures from 5 to 3500 psi. Available as complete receiver mounted units, with base-plate mountings, or as bare compressor units. Can be equipped with automatic-start-and-stop control, constant-speed control, or dual-control to permit selection of either type. For special service such as instrument control or agitation, certain sizes are available with non-lubricated cylinders.

**Ingersoll-Rand**

11 Broadway, New York 4, N. Y.

PUMPS • CONDENSERS • AIR AND ELECTRIC TOOLS • ROCK DRILLS

# Shipping meat trimmings in throwaway bags!

## Paper bags coated with "Alathon" solve moisture problem ... save space, lower shipping and handling costs

Shipping meat trimmings to its sausage kitchens was a costly operation for Oscar Mayer & Co. The containers in use were expensive, and required frequent repairs and washing. Their heat retention made chilling of the meat a lengthy process. And they took up too much storage space.

The company solved the problem with a new way to ship meat trimmings. They selected a multi-wall kraft paper valve bag, coated on the inside with Du Pont "Alathon" polyethylene resin. The coating of "Alathon" enables the bag to keep its strength despite the natural moisture of meat products. The inexpensive bags are discarded after use, eliminating the washing operation with its danger of carrying over detergent odors. The trimmings can be chilled rapidly and uniformly, avoiding danger of sour pockets. And the chilled bags keep their good physical properties, because "Alathon" stays tough and flexible at temperatures as low as 70°F. below zero.

Perhaps "Alathon" polyethylene resin—with its unique combination of properties—can help you solve a packaging problem. Consider using it in multi-ply or single-ply bags, pouch bags, chipboard containers and trays, fiber drums and cartons or corrugated boxes.

*REG. U.S. PAT. OFF.

DU PONT
REG. U.S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY
Polychemicals
DEPARTMENT
PLASTICS • CHEMICALS

**WRITE FOR FREE BOOKLET**

describing the properties and uses of "Alathon" in the packaging field, or simply mail this handy coupon. We'll gladly put you in touch with sources of supply for packaging materials coated with "Alathon."

E. I. du Pont de Nemours & Co. (Inc.)
Polychemicals Dept. 549, Du Pont Bldg., Wilmington 98, Del.

Please send me the new booklet on packages having coatings of "Alathon."

Check type of package most interested in: Multi-wall bags ( ), Single-ply bags ( ), Pouch bags ( ), Overwraps ( ), Fiber drums & cartons ( ), Chipboard containers & trays ( ), Corrugated boxes ( ), Other ( ).

*Name* _____

*Title* _____

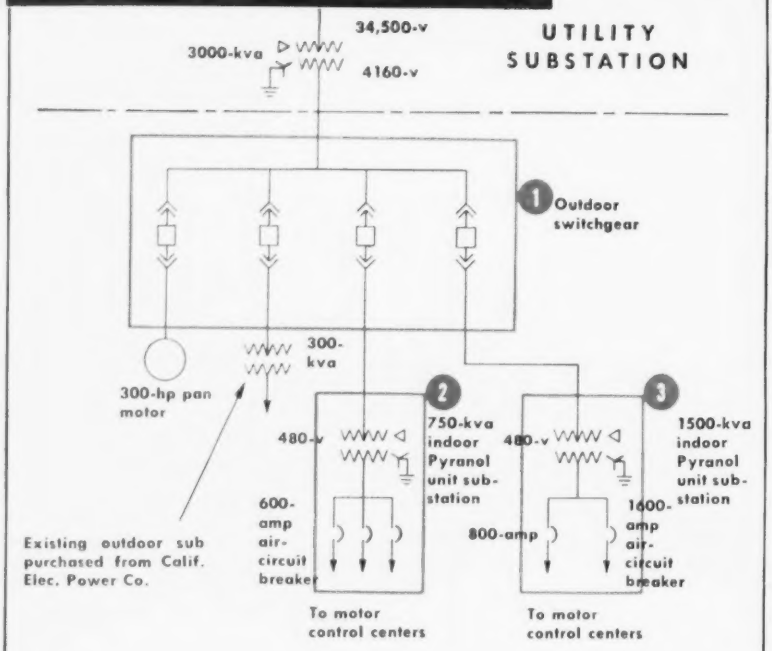
*Company* _____

*Address* _____

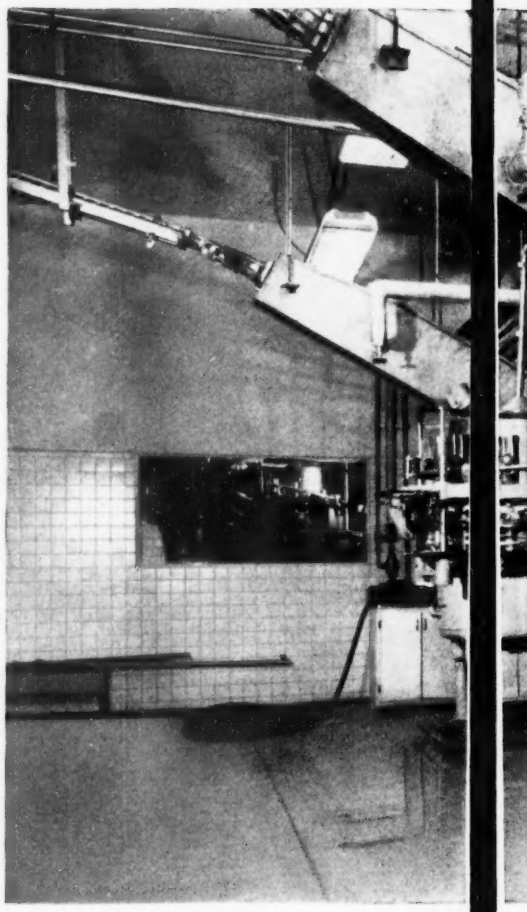
*City* _____ *State* _____


For more information, use coupon on page 157.

## ENGINEERING REPORTS:

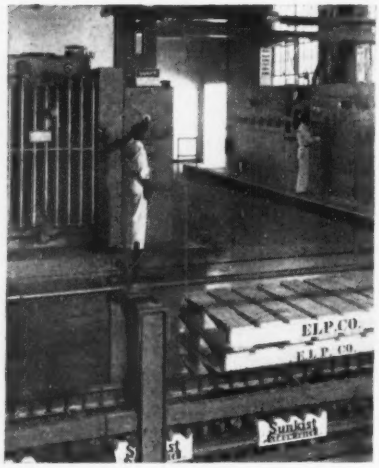



4160- and 480-volt systems neutral grounded to limit possible overvoltages from ground faults

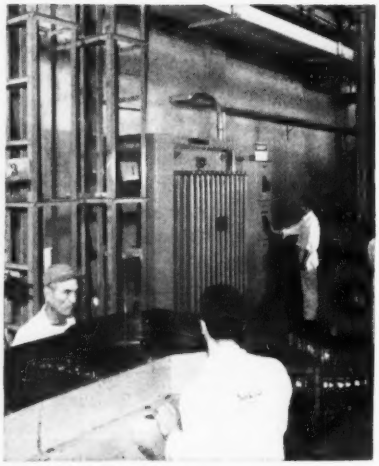


# Planned power system makes it easy

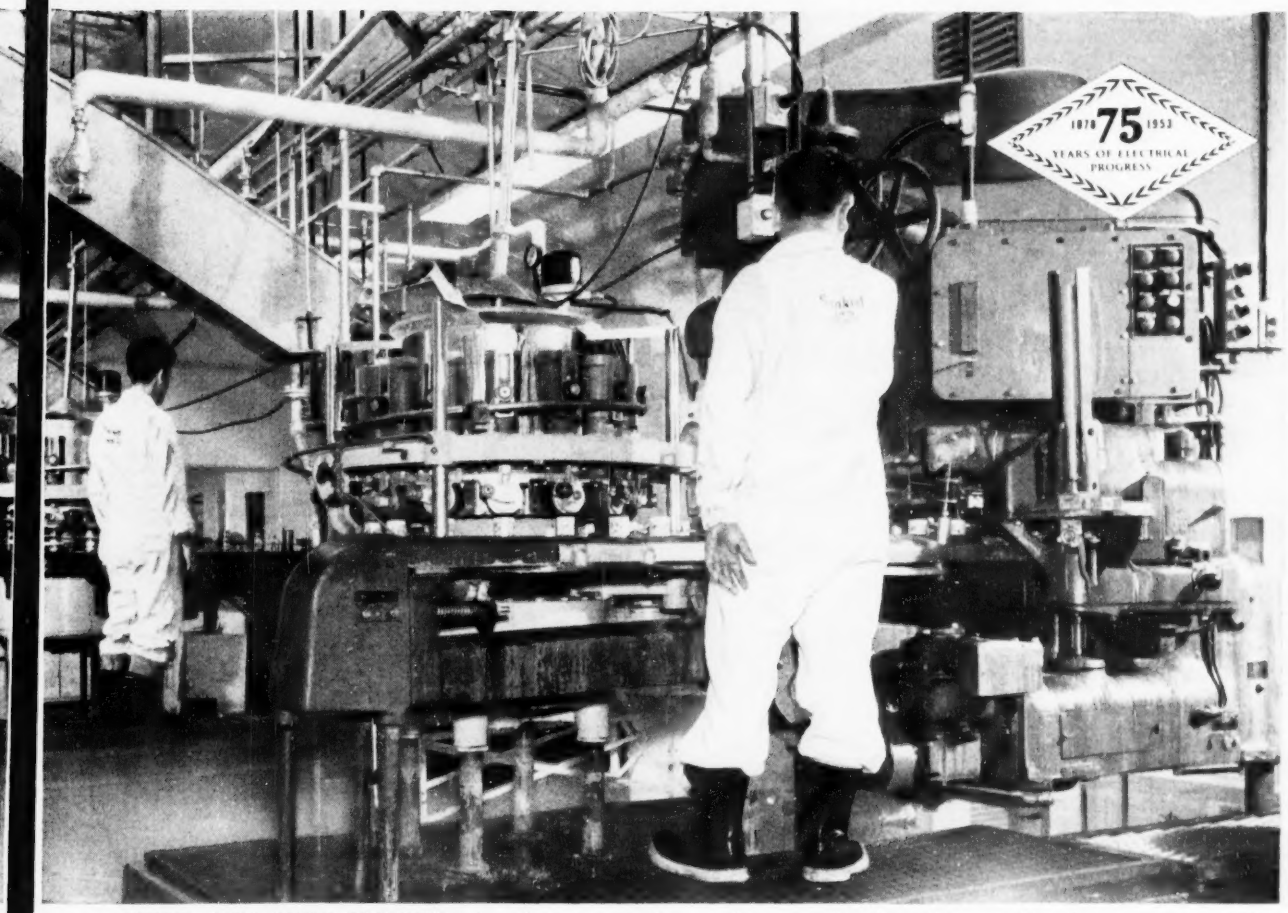
1 Compact, accessible G-E metal clad switch gear distributes high-voltage power to plant. Result: no voltage drop problems, major power savings.




2 750-kva "Building Block" G-E unit substation (background) was easy to install. It was delivered factory-assembled and tested, ready to be set in place.



3 1500-kva unit substation, located near processing line, shortens costly low voltage branch circuits. Drawout circuit breakers simplify maintenance




**BETTER PRODUCTION CONTINUITY** for these two sealing machines at Exchange Lemon Products results from the full voltage delivered by one of the G-E unit substations. Full voltage at utilization points provides adequate motor starting torque, normal loading without excessive currents, and full illumination for plant lighting.

# for juice extraction plant to expand

## Exchange Lemon Products Co. lowers expansion costs with G-E radial power distribution system

Thanks to *system planning*, Exchange Lemon Products Company's juice plant at Corona, Calif., can expand steadily and not outgrow its basic electrical system.

At present, this growing affiliate of Sunkist is processing more than 1500 tons of lemons each day. To handle the heavy electrical loads that have developed, Exchange engineers and General Electric Food Industry specialists worked out a co-ordinated low-cost radial distribution system built around G-E load center unit substations. To keep up with future expansion at minimum expense, additional unit substations can be added like building blocks. This has kept investment low by avoiding purchase of unnecessary transformer capacity.

Strategically located throughout the plant, these G-E unit substations play a key part in keeping the length of costly low voltage feeders to a minimum and reducing the short circuit interrupting duty on feeder breakers while delivering full voltage all along the line. High voltage lines that supply the substations can be extended as the plant grows to tie in additional load centers. The need to run individual feeders all the way back to incoming power can be avoided.

If power loads in your plant are increasing, you probably stand to profit by planning a new power system. Talk it over with your G-E Apparatus Sales Representative—find out how step-by-step modernization with G-E load center substations can spread out costs, prevent production interference. General Electric Company, Schenectady 5, New York. 652-14

**Engineered Electrical Systems for Food Plants**

**GENERAL ELECTRIC**



For more information, use coupon on page 157.

## Here is the start of a tin can

This sturdy looking rig is part of a Malayan tin dredge. Right here, in the heart of Southeast Asia, many of the cans you're using got their start in life.

Tin has been vital in the preservation of foods since the tin can was invented, over 130 years ago. And from original tin canister to modern tin can, the variety of products packaged in tinplated containers has ranged from foods to prayer books — from fishing worms to Geiger counters. Literally!

Today new developments, such as the Winger Method and the Martin Aseptic Process, are being used to prepare still more canned food products. Whole fluid milk, for example. Carbonated soft drinks. And now frozen foods.

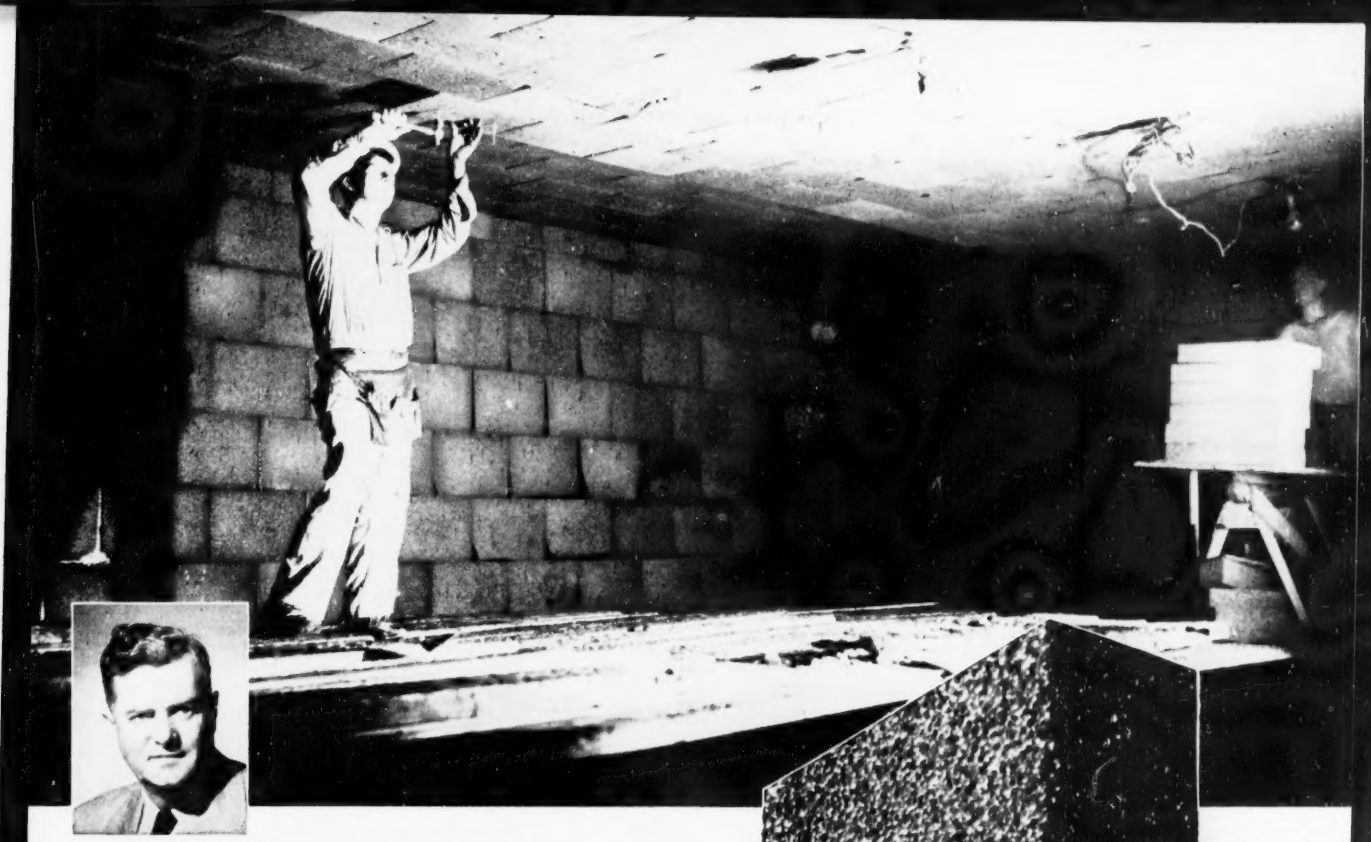
No other material for containers combines all the advantages tin offers the food processing industry. Tin is inert, nontoxic, corrosion resistant. Tin can be electroplated on steel in very thin layers and with few pinholes in the coating. Tin is easily soldered. And the tin can is strong, light, durable—and economical to use.

Over a third of the world's tin is mined and smelted in Malaya. And this famous refined Straits Tin, over 99.87% pure, is world renowned for its absolute reliability of grade. Ask us for any information you may need about Straits Tin.

**TIN NEWS, issued monthly, covers noteworthy current developments in the production, marketing and uses of tin. Write for a free copy.**

MALAYAN TIN BUREAU

**THE MALAYAN TIN BUREAU** Dept. 263, 1028 Connecticut Ave., Washington 6, D.C.





Insulation Contractor: Gordon Insulation Co., East St. Louis, Illinois

## L. E. JOSLIN, Krey Packing Co., finds

# FOAMGLAS

## the ideal insulation for freezer and cooler rooms

"The walls, floors and ceilings of our freezer and cooler rooms, in constant operation at 10°F. and 32°F., were insulated with FOAMGLAS over two years ago," reports L. E. Joslin, Assistant Mechanical Superintendent, Krey Packing Company, St. Louis, Missouri and Belleville, Illinois. "Since that time, FOAMGLAS has proved to be the ideal insulation for our refrigerated spaces because of its long, trouble-free life."

Experience probably has taught you, too, that ordinary insulations readily absorb moisture, impairing thermal efficiency and causing deterioration. The perfect answer to this problem is FOAMGLAS, the *stay-dry* insulation . . . the unique, rigid structure of sealed glass cells which are impervious to moisture or vapor and unaffected by fire or vermin . . . that's why you, like Krey Packing Company, can count on FOAMGLAS for long, constant efficiency.

**PITTSBURGH CORNING CORPORATION**
Pittsburgh 22, Pa.

Pittsburgh Corning Corp., Dept. O-93
Pittsburgh 22, Pa.

Please send me free sample and booklets on use of FOAMGLAS for:

- ☐ Refrigerated Structures
- ☐ Piping and Equipment
- ☐ Normal Temperature Buildings

☐ Send engineer to help with specific problem.
☐ Advise nearest source of supply.

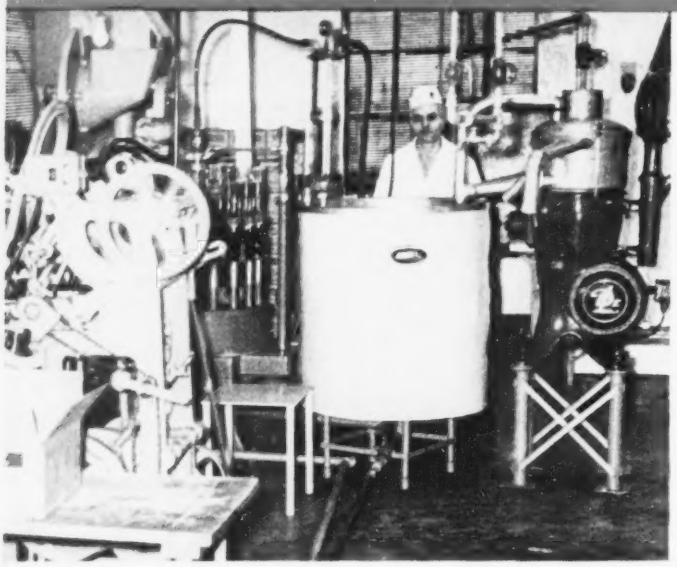
NAME _____ Title

COMPANY _____

ADDRESS _____

CITY _____ Zone _____ State

# THE CENTRIFUGE THAT MAKES SOY SAUCE TASTE BETTER!



**. . . De Laval Clarifier for Removing Protein Matter from Soy Sauce**

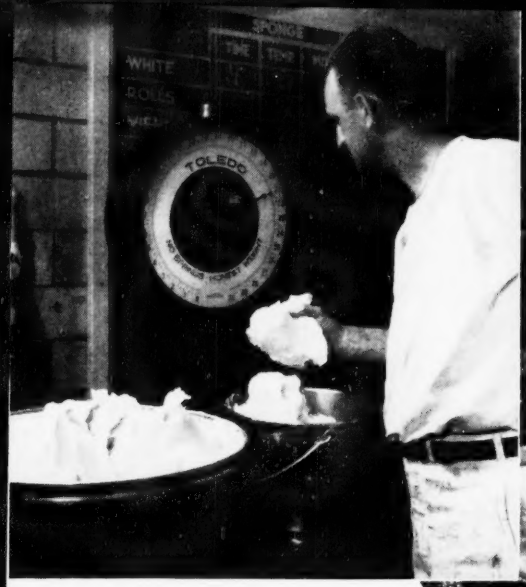
Shoyu sauce, as it is known in the Orient, or soy sauce as it is called here, has been a favorite relish in all parts of the world for many centuries. It tastes best when the protein matter that forms when heat is applied to sterilized soy sauce is removed from the sauce. De Laval Clarifiers make this removal promptly and effectively, producing a delicious and clear sauce.

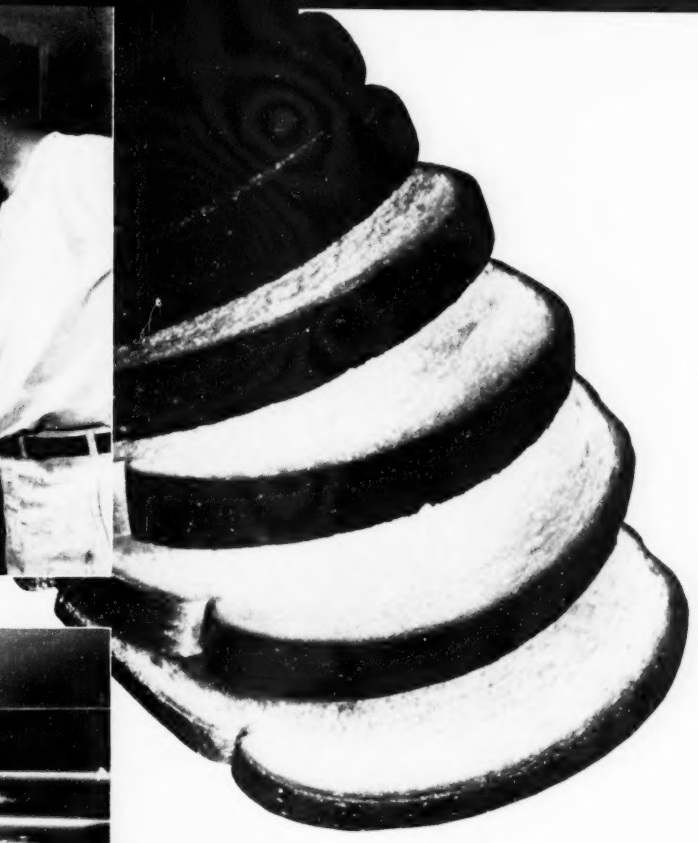
Here is another typical example of how De Laval Centrifugal Clarifiers not only speed up a manufacturing process but improve a product while doing so. Whenever liquid-liquid, liquid-solid, or liquid-liquid-solid separations are part of a production process, it will usually pay you to explore the savings that De Laval machines can make for you.

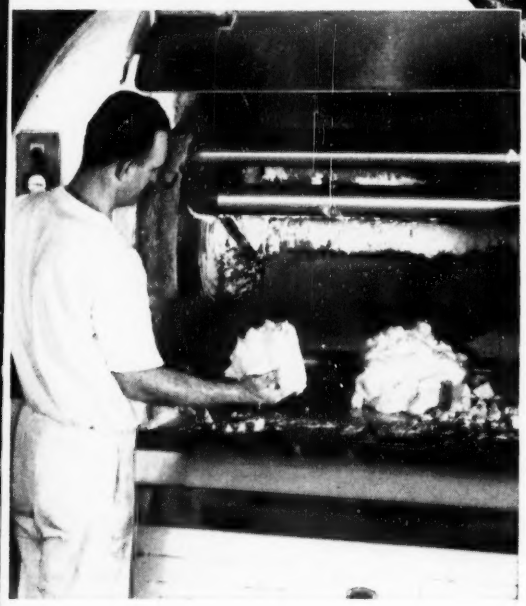
**De Laval**

**THE DE LAVAL SEPARATOR COMPANY**
Chicago POUGHKEEPSIE, N.Y. San Francisco

**FOR FASTER PROCESSING SYSTEMS**





# It's easier to bake better bread with **Myvatex Food Emulsifier**

You'll find your man at the scales is quicker and more accurate with Myvatex Food Emulsifier. There's never any liquid separating out of this firm, easy-to-handle product. Its consistency is uniform right to the bottom of the drum and doesn't vary with shop temperature.

There's no need to change your shop practices, either. Myvatex can be added to the sponge mix or the dough. And, being a plastic fat, there's no melting before use, no necessity of making a water dispersion to assure complete incorporation in the mixer.

This safe, all-nutrition emulsifier is made from prime steam lard. As an optional ingredient in bread, it can be added in the ratio of one pound to four or more pounds of lard.

A test of Myvatex Food Emulsifier in your own shop will show you how it can improve the tenderness, taste, and looks of your product, why it is easier to use. Let us know how much you need for a fair test. ***Distillation Products Industries,*** Rochester 3, N. Y. Sales offices: New York and Chicago • W. M. Gillies and Company, Los Angeles and San Francisco • Charles Albert Smith Limited, Montreal and Toronto.

*distillers of monoglycerides made from natural fats and oils*

DPi

Also . . . vitamins A and E

"Myvatex" is a trade-mark.

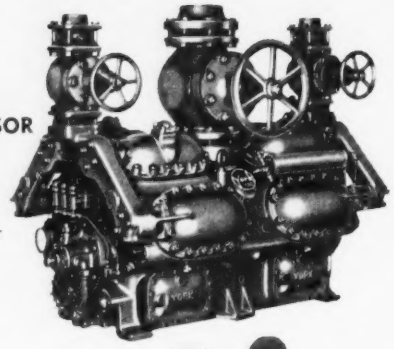
**Distillation Products Industries** *is a division of* **Eastman Kodak Company**

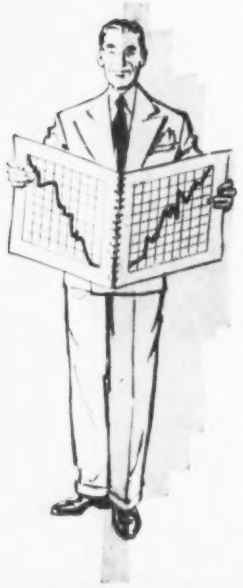
*HERE'S WHY SO MANY FOOD PLANTS HAVE MADE THE YORK V/W . . .*

# first choice for refrigeration

**YORK V/W REFRIGERATION COMPRESSOR**
**4, 6, 8, 12, 16 cylinders.**
**5 to 300 tons capacity**

Operates at low power and maintenance costs when loads are heavy—saves up to 72% power costs when loads are light!





During off seasons, food plant managers want refrigeration costs to drop proportionately. During *high-volume* seasons, they want equipment to run with trouble-free efficiency at minimum operation costs.

The York V/W Refrigeration Compressor, designed specifically for such Variable Work-Load conditions, also offers these advantages—important in *any* refrigeration compressor:

1. **Low Initial Costs**
2. **Low Operating Costs**
3. **Space-Saving Compactness**
4. **Simplified Motors and Starting Controls**
5. **Low Maintenance Costs**
6. **Vibration-Free Operation**
7. **Positive Lubrication**
8. **Positive Shaft Seal**
9. **Booster and/or High-Stage Operation**

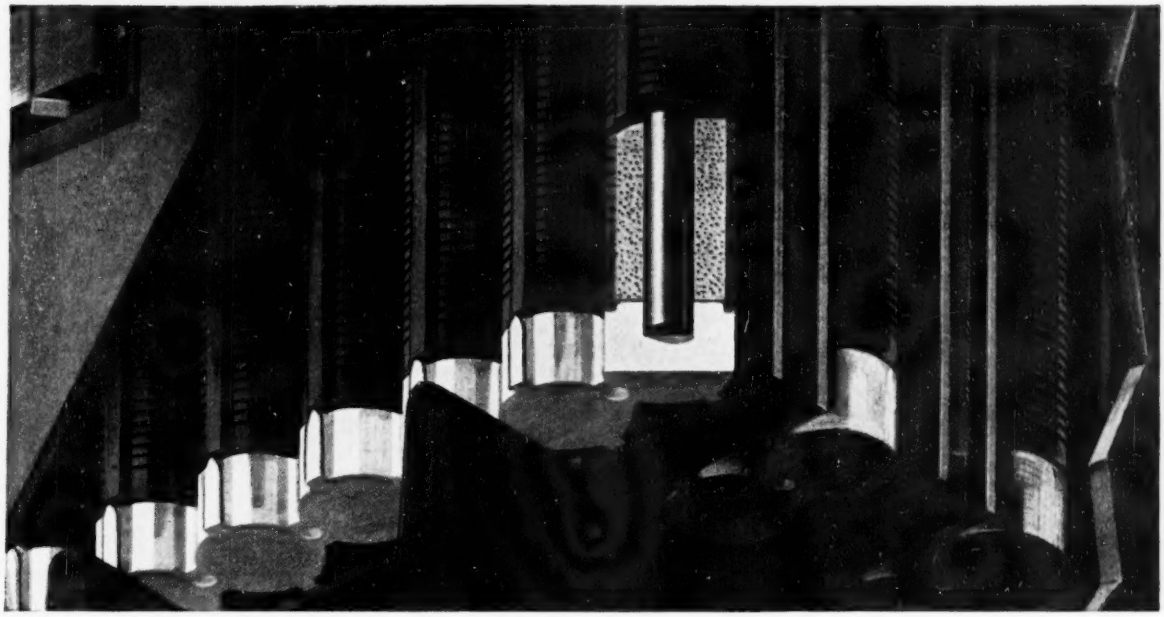
Call your York Representative. At no obligation, he will show you in detail why the York V/W Refrigeration Compressor has been first choice in other food plants . . . why it *can* be in *yours*.
Or write today to York Corporation, York, Pennsylvania.

**YORK** REFRIGERATION AND AIR CONDITIONING
**HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885**

York refrigeration and air conditioning

# YOU'LL FIND THE DIFFERENCE INSIDE THE

# Exide-Ironclad



Inside . . . where it counts most . . . EXIDE-IRONCLAD is entirely different than any other battery. It's made that way by EXIDE'S exclusive IRONCLAD slotted-tube construction . . . a principle that provides direct operating-hour savings for you.

**OF ALL BATTERIES, ONLY EXIDE-IRONCLADS HAVE POWER TUBE POSITIVES**

The positive plate is different . . . unique . . . exclusive. It is the most effective retainer of active material yet demonstrated in heavy duty service. Slotted tubes contain the active material. So fine are the slots that, while permitting easy access of electrolyte, they retard the active material from washing out, hold it during repeated cycles of charge-discharge, and the vibration of rough use.

Today's battery-powered equipment is being used harder than ever before. Unless the batteries have internal shock protection they tend to deteriorate under hard usage—both electrical and mechanical. Only Exide-Ironclad has the plus-protection of the tubular positive that can withstand today's more exacting and rigorous heavy-duty battery services.

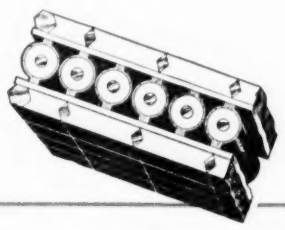
Your EXIDE sales engineer will give you the factual inside story. See for yourself why *only* an EXIDE-IRONCLAD gives maximum day-after-day service under the most difficult operating conditions . . . *with a minimum of maintenance expense.*

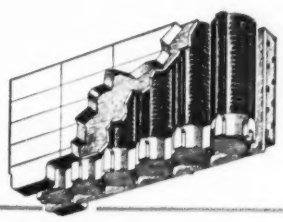
---

Cross section shows relation of positive plate to separators and negative plate. Note the much greater exposure of active material to electrolyte as compared with that of the usual flat positive plate. This greater exposure makes possible the high power ability and uniform-voltage characteristics of the Exide-Ironclad. The negative plates have been made extra heavy to balance the increased capacity of the power tube positives.

Running through center of each tube is an alloy core which is cast with the heavy top cross bar. These form the sturdy, non-buckling grid. Both core and top bar are made of Exide's new corrosion-resistant Silvium, an alloy of silver, lead and other components, which adds greatly to plate's long life.

New polyethylene insulating tube sealer of acid-proof, non-corroding plastic fits snugly into bottom of slotted tubes and further reduces loss of active material. Thus more active material remains available, and the high battery capacity is maintained for a longer working life.

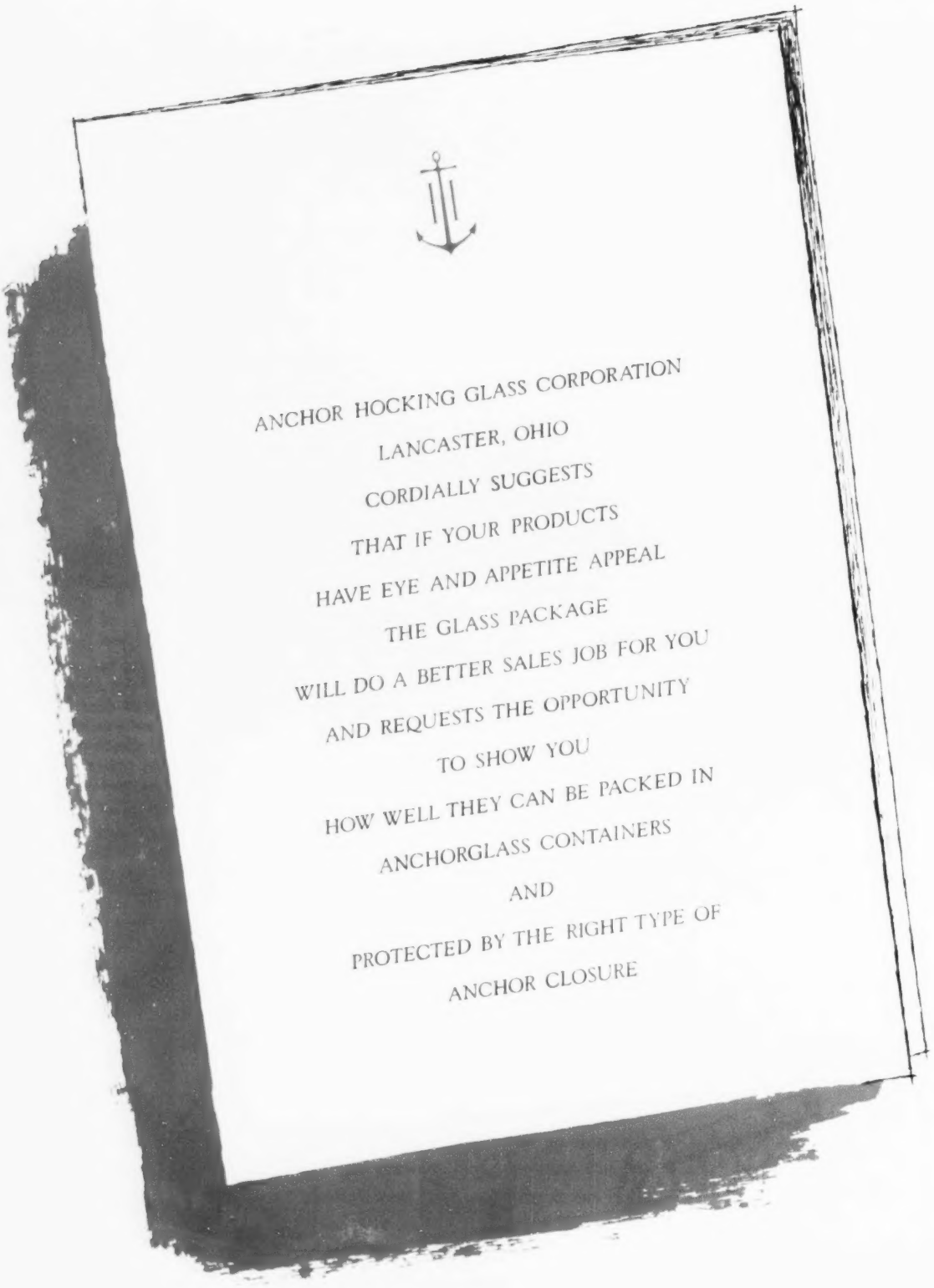




***1888 . . . DEPENDABLE BATTERIES FOR 65 YEARS . . . 1953***

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 2 • *Exide Batteries of Canada, Limited, Toronto*

"EXIDE-IRONCLAD" and "SILVIUM" *Reg. T.M. U.S. Pat. Off.*

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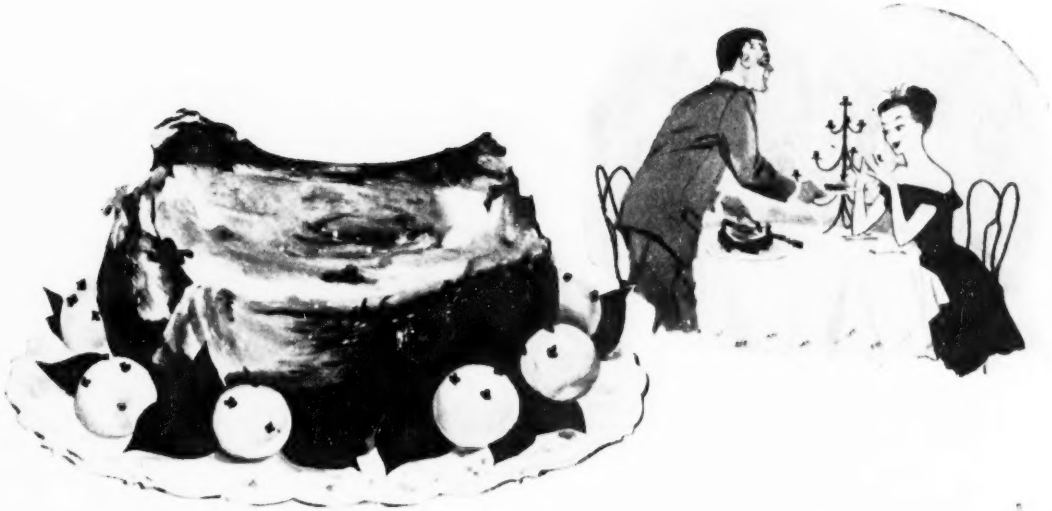

*If you couldn't get* **ROAST BEEF...**

*BEEF STEW would fill the bill!*

## IT'S THE SAME WITH STAINLESS STEEL

Just as there's usually something else equally savory when the dish you had in mind isn't on the menu, there are alternate grades of Allegheny Metal to take the place of types which may be temporarily unavailable because of alloy restrictions and defense demands. In most cases you'd never know the difference in looks or performance, and in many cases there's little or no change in fabricating methods, and a possible advantage in cost. ● You don't have to *wait* to enjoy the competitive edge that Allegheny Metal's great strength, corrosion resistance and clean, shining beauty can give you—let us work with you NOW. *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*

You can make it **BETTER** with

# Allegheny Metal

AL TIME-TESTED STAINLESS STEEL

**Warehouse stocks carried by all Ryerson plants**

W&D 4710 B



For more information, use coupon on page 157.

# JENKINS PRACTICAL PIPING LAYOUTS

68

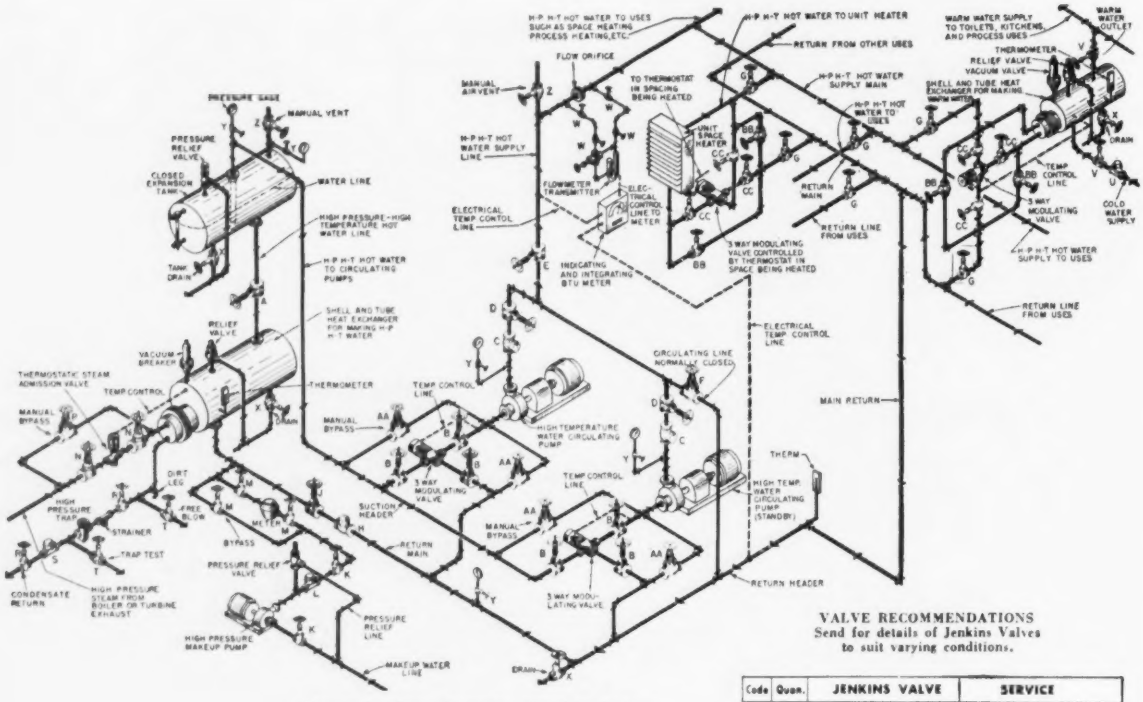


Diagram by Huxley Madeheim, Consulting Engineer
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## *How to plan a* HIGH PRESSURE-HIGH TEMPERATURE HOT WATER PIPING SYSTEM

**For efficient space and water heating** — and for numerous processing needs as well — a high pressure-high temperature system offers several distinct advantages over a steam system.

**Often operated at pressures up to 215 psi,** with a corresponding temperature of 388°F, a HP-HT system of this type eliminates the need for pitch, drainage, or traps and provides a greater amount of heat transmission for a given pipe size. Moreover, it requires no feed-water treatment and, when used for processing services, eliminates large pressure drops due to sudden load conditions.

**The hot water** is generated in a shell and tube heat exchanger by means of high pressure steam from either turbine extraction or exhaust. Unit heaters on the HP-HT lines provide for space heating requirements and a shell and tube heat exchanger supplies warm water for lavatories, kitchens, and processing which requires moderate temperatures. When used with accumulators, this system eliminates the need for taking additional steam directly from the steam generating source and, thus, provides a better plant heat balance.

**Consultation** with accredited piping engineers and contractors is recommended when planning any major piping installation.

To save time, to simplify planning, to get all the advantages of Jenkins specialized valve engineering experience, select all the valves you need from the complete Jenkins line. It's your best assurance of *lowest cost in the long run.* Jenkins Bros., 100 Park Ave., New York 17.

Complete description and enlarged diagram of this layout free on request. Includes additional detailed information. Simply ask for Piping Layout No. 68.

**VALVE RECOMMENDATIONS**
**Send for details of Jenkins Valves to suit varying conditions.**

| Code | Quan. | JENKINS VALVE | SERVICE |
|---|---|---|---|
| A | 1 | Fig. 204 IBBM Gate | HP-HT Hot Water Shutoff |
| B | 6 | Fig. 204 IBBM Gate | 3 Way Valve Shutoff |
| C | 2 | Fig. 339-R IBBM Swing Check | Prevent Backflow |
| D | 2 | Fig. 204 IBBM Gate | Pump Discharge Shutoff |
| E | 1 | Fig. 204 IBBM Gate | Supply Line Shutoff |
| F | 1 | Fig. 923 IBBM Globe | Circulating Line Shutoff |
| G | 6 | Fig. 280 Bronze Gate | Branch Shutoffs |
| H | 1 | Fig. 339-R IBBM Swing Check | Prevent Backflow |
| J | 1 | Fig. 204 IBBM Gate | Return Main Shutoff |
| K | 2 | Fig. 280-U Bronze Gate | Makeup Pump Shutoff |
| L | 1 | Fig. 962 Bronze Swing Check | Prevent Backflow |
| M | 3 | Fig. 280 Bronze Gate | Makeup Meter Shutoff |
| N | 2 | Fig. 1010 Cast Steel Gate | Thermostatic Valve Shutoff |
| P | 1 | Fig. 1042 Cast Steel Globe | ThermostaticValveBypass |
| R | 2 | Fig. 280-UN Bronze Gate | Condensate Line Shutoff |
| S | 1 | Fig. 962 Bronze Swing Check | Prevent Condensate Backflow |
| T | 2 | Fig. 976-A Bronze Globe | Trap Test, Free Blow |
| U | 1 | Fig. 352 Bronze Swing Check | Prevent Backflow |
| V | 2 | Fig. 47-U Bronze Gate | Cold Water Shutoff |
| W | 4 | Fig. 703 Bronze Globe | Flow Meter Pressure Taps |
| X | 4 | Fig. 976-A Bronze Globe | Drain Lines |
| Y | 5 | Fig. 703 Bronze Globe | Pressure Gage Control |
| Z | 2 | Fig. 976-A Bronze Globe | Air Vents |
| AA | 4 | Fig. 923 IBBM Globe | 3 Way Valve Bypass |
| BB | 4 | Fig. 976-A Bronze Globe | 3 Way Valve Bypass |
| CC | 6 | Fig. 280 Bronze Gate | 3 Way Valve Shutoff |

JENKINS VALVES
LOOK FOR THE DIAMOND MARK
SINCE 1864
Jenkins Bros

# Canada Packers Speed Deliveries

## with the WHITE 3000

**YOU CAN** do more work . . . in less time . . . at lower cost with the White 3000.

That is the economy report on this modern White 3000 from leaders in food processing industries, from coast to coast.

Its functional design is tailored right to your exact delivery needs. Power-lift cab reduces maintenance cost substantially. And the handsome White 3000 stays new . . . year after year.

Get the White 3000 story from your White Representative. It will save more..sell more..in your service.

**THE WHITE MOTOR COMPANY**
**Cleveland 1, Ohio**

### Saves Time . . . Cuts Cost

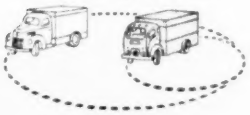
DOMESTIC SHORTENING and other Canada Packer products are delivered in Winnipeg, Canada area in this handsome White Model 3014. Extra-capacity body means longer routes . . . more deliveries per day. It's a rolling billboard for Canada Packers.

White

*FOR MORE THAN 50 YEARS*
*THE GREATEST NAME IN TRUCKS*

**IN EVERY FEATURE . . . TOMORROW'S TRUCK TODAY**

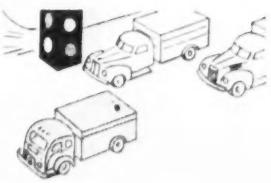
SAVES SPACE at the loading dock, in traffic, parking and in the garage.



SHORTER turning radius for better maneuvering, and substantial savings in driving time.

DROP FRAME design lowers loading height, saves reaching, saves driver energy.

SAFER, BETTER to drive because of wide angle vision, new cab comfort, driving ease, faster acceleration.





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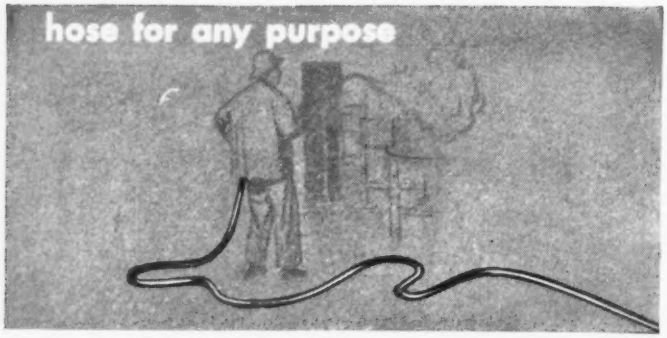
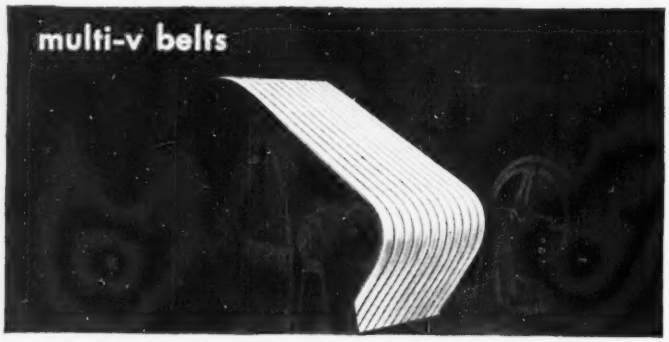


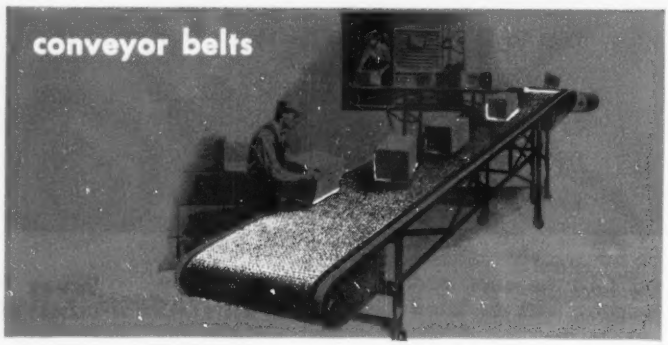




## Long lasting dependability

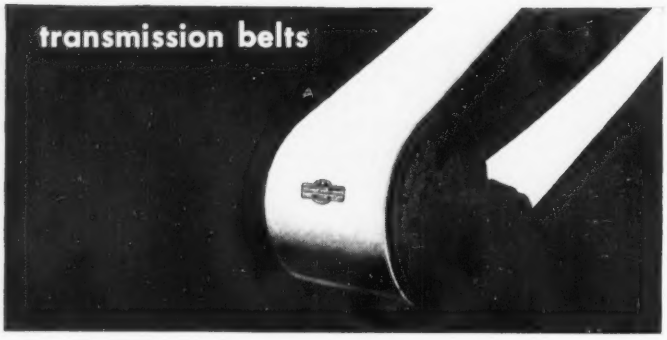
of Thermoid Products saves important production and maintenance dollars. That's why so many leading companies, in all industries, specify Thermoid Hose, Multi-V Belts, Conveyor Belts, and Transmission Belting.

The companies who use these "built-for-the-job" products like the *service* they get from their Thermoid Distributors—plus the help of experienced Thermoid Sales Engineers with their intimate knowledge of your mechanical rubber problems.

It will pay you to specify Thermoid.




Thermoid
Industrial Rubber Products
Quality Value Service

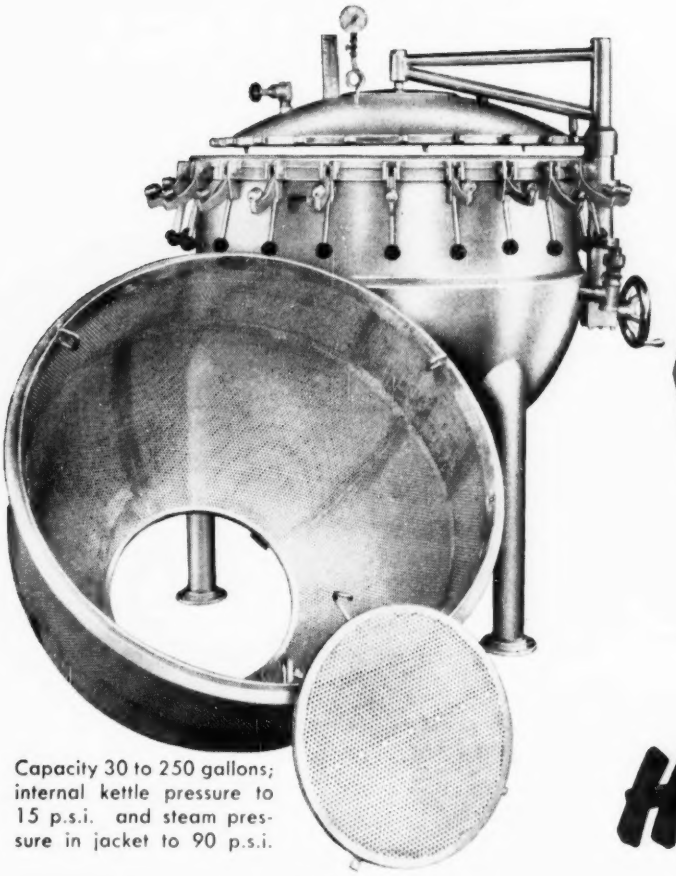



Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah



Capacity 30 to 250 gallons; internal kettle pressure to 15 p.s.i. and steam pressure in jacket to 90 p.s.i.

# FASTER HEAT-UP . . . QUICKER PROCESSING WITH Hamilton's NEW SANITARY PRESSURE COOKER

You can cut production time materially with this newly designed Hamilton Pressure Cooker. Here are 3 reasons why it's faster:

1. Full "super-jacket" space with entire hemisphere of inner bowl exposed to steam.
2. Extra large inside diameter of kettle.
3. Steam jacket equipped with specially designed steam spreader.

And here are 3 reasons why it's completely sanitary:

1. Tubular legs with smooth kettle sockets.
2. Adjustable vermin-repellent floor flanges.
3. Highly polished stainless steel interior, easy to clean.

You'll want to know its low cost. Write for Data Sheet H-12 today

**Hamilton** copper and brass works

Division of the Brighton Copper Works Inc. • 820 State Ave., Cincinnati, Ohio

Hamilton Copper & Brass Works, Dept. L
820 State Ave., Cincinnati 4, Ohio

Please send Data Sheet H-12 on the new Hamilton PC Pressure Cooker.

NAME_____

COMPANY_____

ADDRESS_____



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# Containers that KEEP the BEST ...in YOUR BEST

Sturdy steel drums and pails—made with care and accuracy in every detail—provide dependable protection for the best sales assets of your products. They make certain that the qualities that have been sold to your customers remain safely sealed.

That's why J&L Steel Drums and Pails are standard packaging specifications for many leading product brands. They have proved through years of dependable service that they meet the most rigid tests for durability.

Plants for the manufacture of J&L Steel Drums and Pails are located in leading industrial centers to assure quick, efficient service to meet your requirements. Call the nearest J&L office . . . or, contact our headquarters office in New York City.

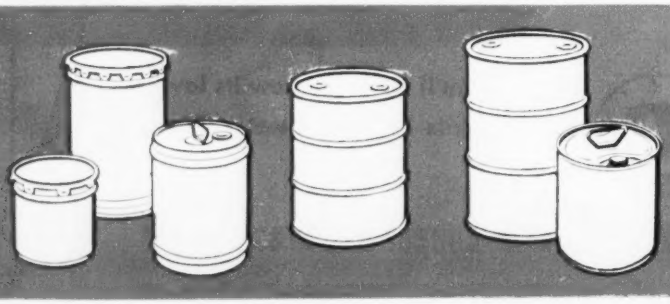
**JONES & LAUGHLIN STEEL CORPORATION**
*Container Division*
CHRYSLER BUILDING • NEW YORK 17, N.Y.

PLANTS: Bayonne, N.J. . . . Cleveland, Ohio . . . Philadelphia, Pa. . . . New Orleans, La. . . . Kansas City, Kan. . . . Atlanta, Ga. . . . West Port Arthur, Texas . . . Toledo, Ohio

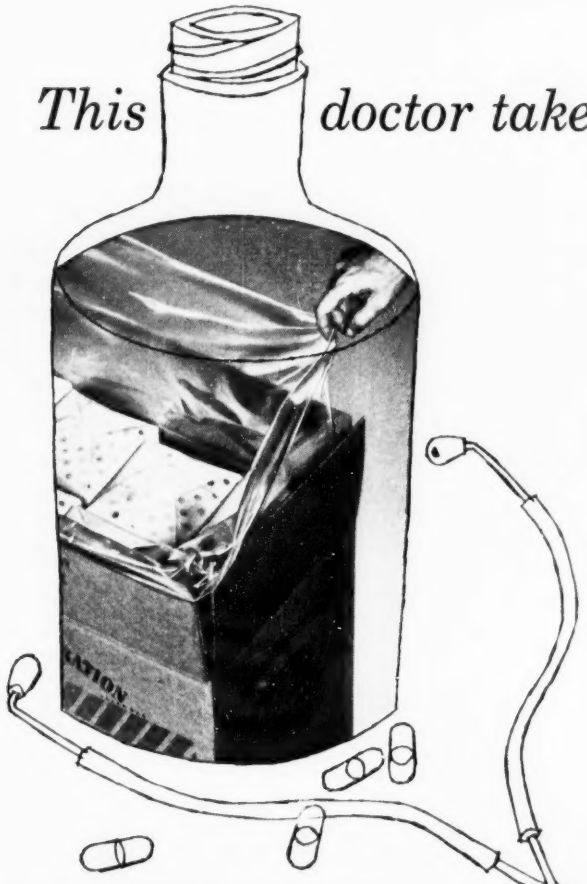
**J&L STEEL**

The J&L Line includes all types of Closures and Finishes. Bright, colorful decorations may be reproduced to your specifications.

• Heavy-duty ICC Drums • Light-gauge Drums • 55, 30 and 15 gal. capacity and 100-lb. Grease Drums • Lightweight Drums for Chemical and Powdered Materials • 1-10 gal. capacity Steel Pails for Foods, Chemicals, Oils



# *This doctor takes his own medicine!*



For years VISKING's job has been to write the best possible prescriptions that would solve packaging problems for others.

It wasn't surprising, then, that we should write a prescription for ourselves when we faced a problem in moisture control.

VISKING's NoJax Casings (for SKINLESS franks) are at their best for processing when they leave the plant. They are packaged in an atmosphere containing just the right amount of water vapor.

But the conventional shipping carton did not keep them in that state. Sometimes they got too dry. Sometimes they absorbed too much moisture.

Exhaustive tests in the VISKING laboratories showed that a carton liner of **VISQUEEN** film would provide complete moisture control. Now every carton of NoJax contains a **VISQUEEN** liner. Casings are always in perfect shape for the packer's stuffing table.

If you have a tough packaging problem involving moisture, corrosives or what have you, consult a **VISQUEEN** converter. Our technological skills are at his call. To get better packaging, use the coupon.

# VISQUEEN®

**Important!** VISQUEEN film is all polyethylene, but not all polyethylene is VISQUEEN. The VISKING CORPORATION pioneered pure polyethylene film. Only VISQUEEN has the benefit of our technical skills and research. VISQUEEN is produced by process of U. S. Patents No. 2461975 and 2632206.

VisQueen® film...

a product of the Visking corporation

World's largest producers of polyethylene sheeting and tubing

**Plastics Division, Terre Haute, Indiana**

**In Canada: Visking Limited, Lindsay, Ontario**

**THE VISKING CORPORATION, BOX R9-1410**
**Plastics Division, Terre Haute, Indiana**

Send me names of VISQUEEN converters serving my area.

Name_____

Company_____

Address_____

City_____ Zone____ State_____



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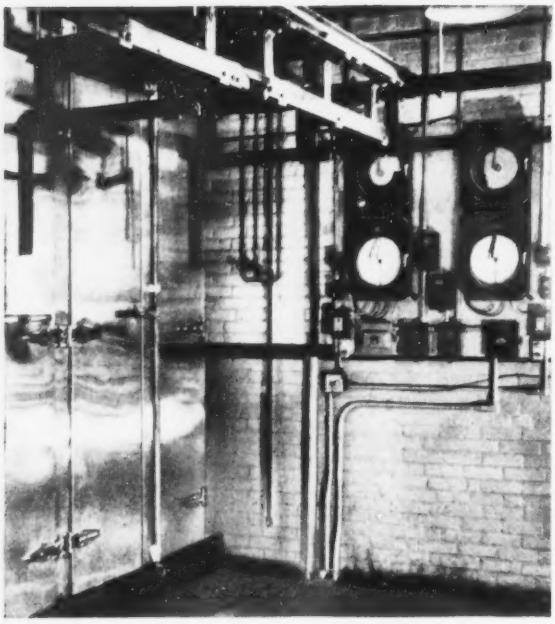
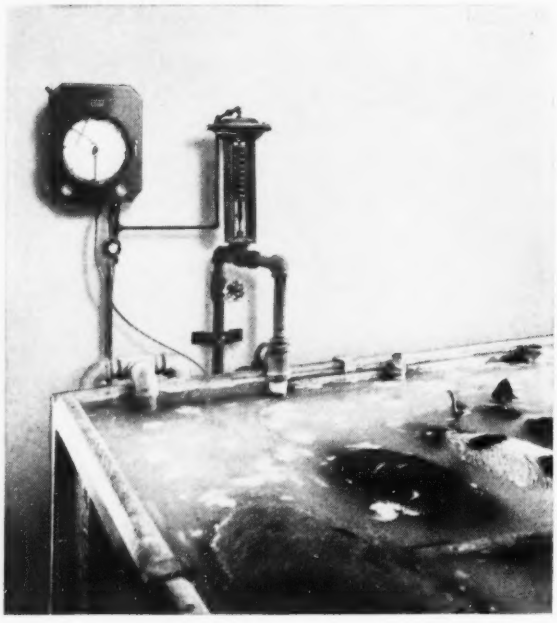
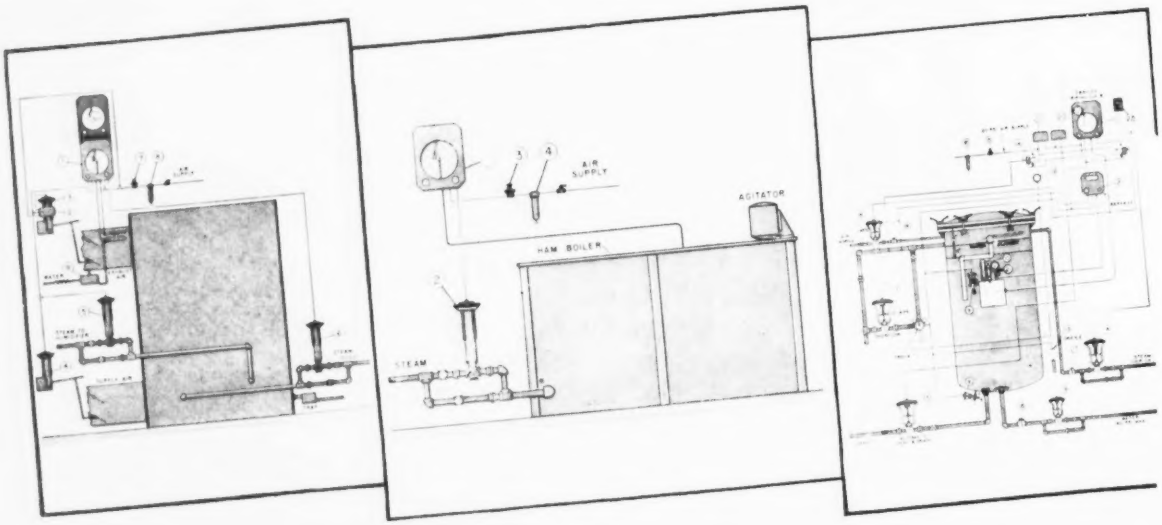
# BRING HOME THE BACON



**Taylor Smokehouse Control System** gives completely automatic, push button control of both time and temperature in air conditioned houses. Insures uniform flavor, and quality, holds shrinkage to a minimum.



**This Taylor Control System** on the Dehairing Vat shown above not only records the temperature of the solution, it throttles the steam supply to precisely maintain the required temperature. Result—proper hair removal and no skin discoloration.




**Push-button Smokehouse Control.** Cam-controlled wet-and-dry bulb temperature assures accurate duplication of the ideal processing schedule.

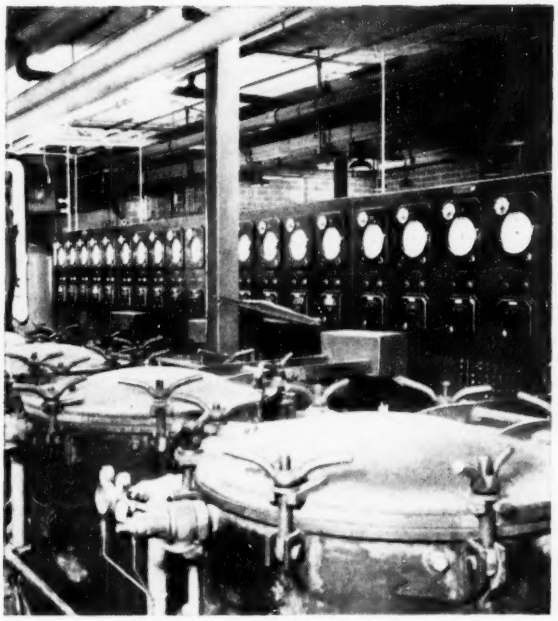
**Control System for Ham Boiling.** The FULSCOPE* Limited Range Recording Controller precisely and automatically maintains proper boiling temperature. Also records duration of each batch processed. Scores of enthusiastic users.

**Fully Automatic Retort Control.** Minimizes come-up time; precisely controls and times the cooking period and safely regulates every phase of cooling.


For more information, use coupon on page 157.

# ...AUTOMATICALLY

## with Taylor Control Systems

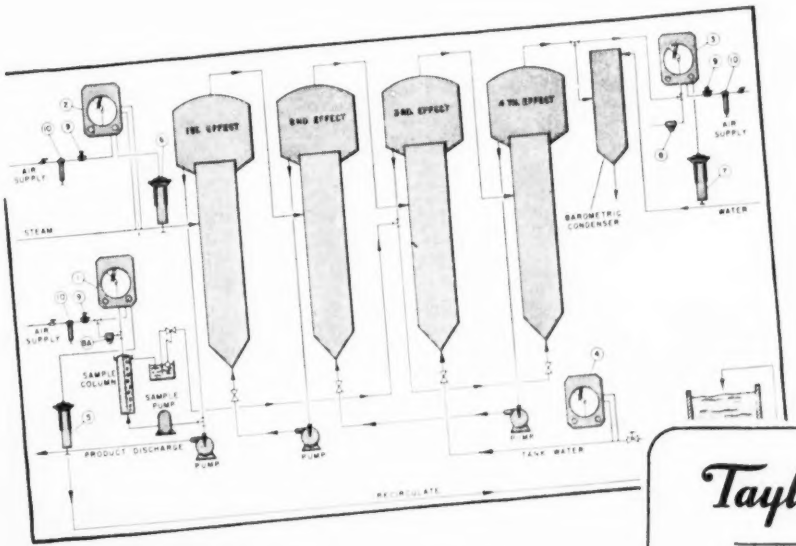


**Unsolicited reports** from users show an increased production of 10 to 25% from battery of retorts using this Taylor Control System. The process is timed and temperature and pressure are controlled. The operator simply loads the retort and pushes the start button.

FROM the scalding tank, right through to the warehouse, you'll find there are Taylor control systems designed for each step along the way. Designed to cut operating costs, help you maintain product quality—or even improve it—and give you years of efficient, dependable service.

In addition to those shown here, there are Taylor Control Systems for **Scalding Tanks, Dehairers, Depilators, Hot Water Systems, Washers, Casing Soakers, Ovens, Chill Rooms, Meat Cutters, Sausage Mixers, Jourdan Cookers, Lard Rendering, Coolers, Evaporators, and Air Conditioning.**

It will cost you nothing to call in your Taylor Field Engineer—and it may save you money. Send for **Catalog 500MP.** Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.




**Stick Water Evaporator Control System** is a completely coordinated control system, including product flow control, steam flow control, level controls on each effect, absolute pressure control and specific gravity of the final product. Conserves water, salvages maximum yield of valuable by-product.

*Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.*

*Reg. U. S. Pat. Off.

**Taylor Instruments**
**MEAN**
**ACCURACY FIRST**
**IN HOME AND INDUSTRY**


For more information, use coupon on page 157.

# Density Tests help maintain Uniformity in Bottles by BALL

From the point where the batch enters the furnace, Ball technicians take frequent samples of molten glass. These are analyzed on the Density Comparitor, which quickly determines uniformity of composition. Any variation can be corrected *at the start*. And this is but one of many operations that control the quality of Ball Containers and Closures, and help assure delivery of your order . . . exactly as specified.

**Call Ball first of all for:**

Stock or Special Mold Glass Containers . . .
Plain or Lithographed Metal Screw Caps.

**BALL BROTHERS COMPANY • Muncie, Ind.**
Closure Division: The ARIDOR Company, 3428 W. 48th Place, Chicago 32, Ill.
Offices in All Principal Cities

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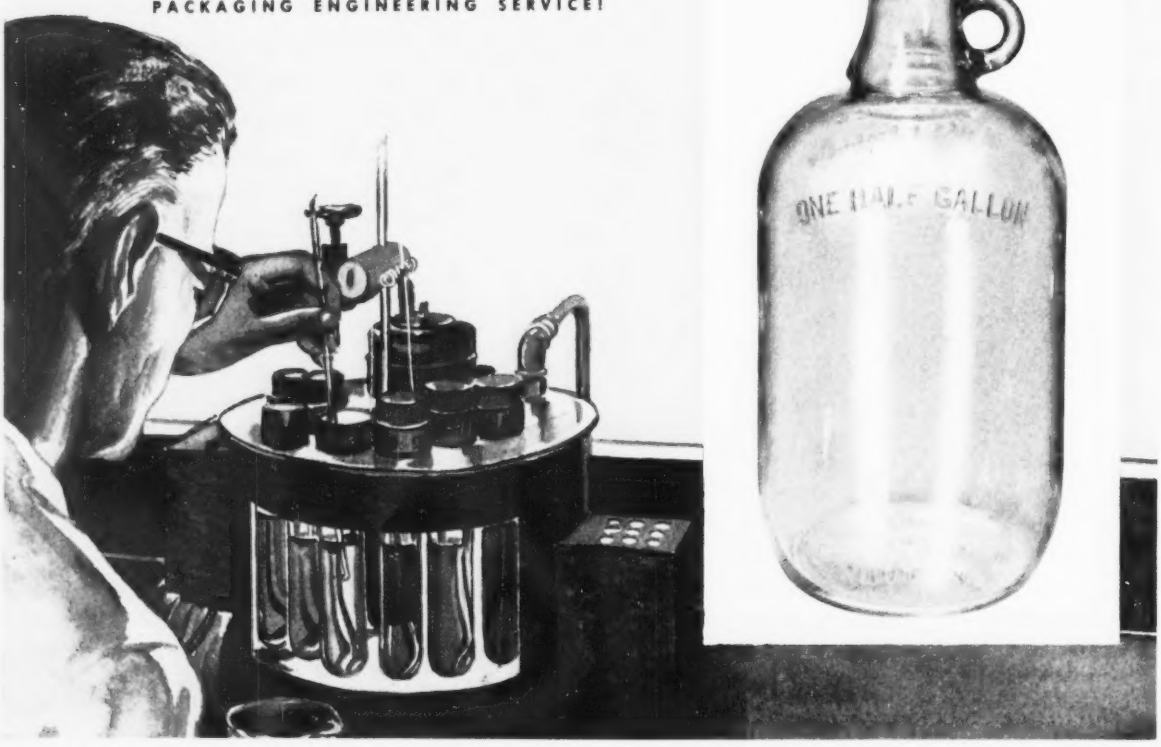

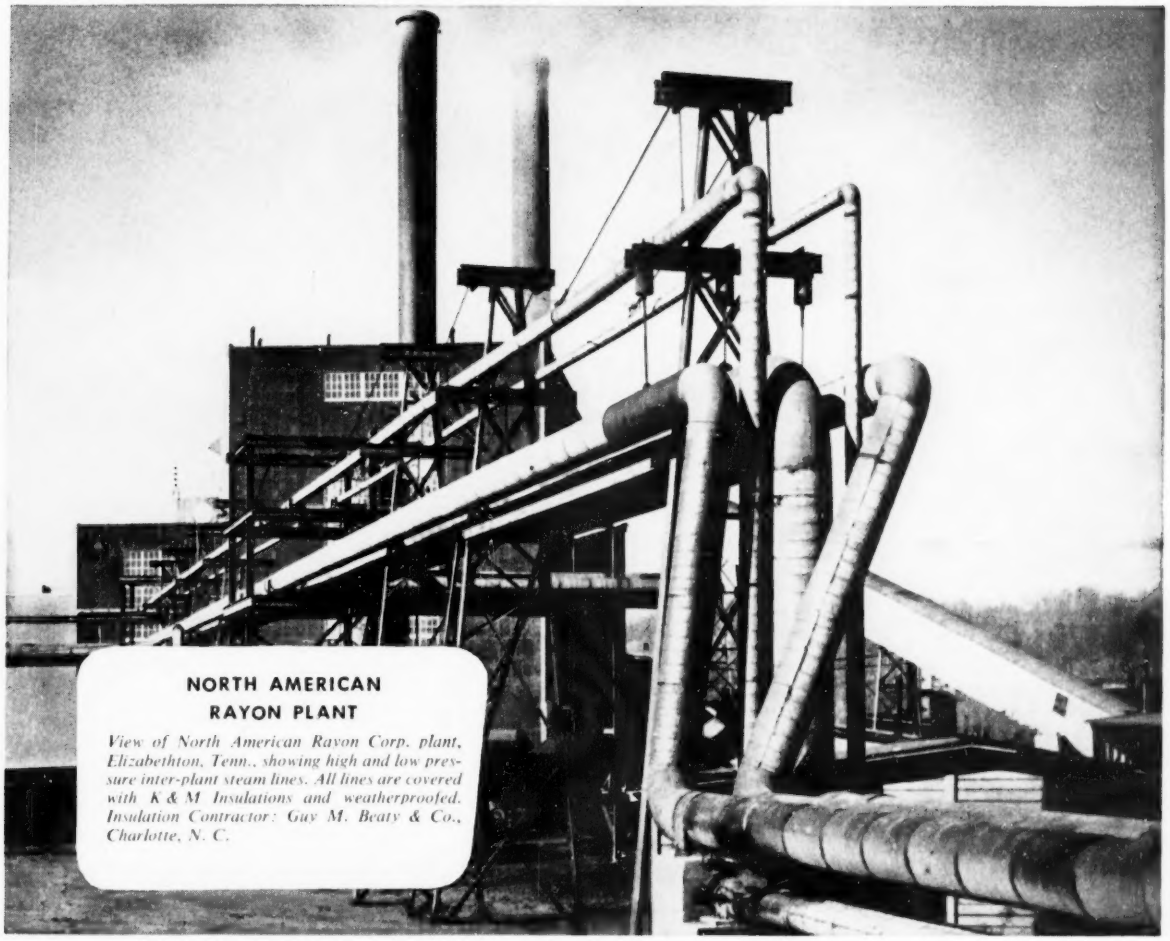

**NORTH AMERICAN RAYON PLANT**

*View of North American Rayon Corp. plant, Elizabethton, Tenn., showing high and low pressure inter-plant steam lines. All lines are covered with K & M Insulations and weatherproofed. Insulation Contractor: Guy M. Beaty & Co., Charlotte, N. C.*

# *Steam takes weather in stride*

## – under K&M Insulations!

THE steam lines pictured above run more than 2000 feet in the open air—exposed daily to sun, rain, and constant air-temperature change. Yet, because of efficient K&M Insulations, the steam travels these lines with minimum temperature loss. To the plant owners, that means power saved, money saved!

The two products that keep this heat within bounds are K&M Hy-Temp Insulation and "Featherweight" 85% Magnesia. Hy-Temp (diatomaceous silica) has exceptional heat-resisting qualities, and is put directly on the hot surface. A sufficient thickness brings its outside surface temperature to 600° F. or lower.

"Featherweight" 85% Magnesia, a superb insulator, is used as the second layer; and its surface may then be covered and painted, or weatherproofed for outdoor service, as in the illustration above.

K&M Hy-Temp and "Featherweight" in combination are effective on applications up to 1900° F. Two separate layers of insulation with vertical and horizontal staggered joints eliminate heat loss which occurs when expansion of hot piping and equipment causes joints to open in single layer installations. Both materials are made in a variety of sizes, shapes, and thicknesses to suit any application.

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*Nature makes sorbitol HERE*

# ATLAS
## makes sorbitol from *farm-produced sugars*

Sorbitol is found in nature as a sweet, nutrient ingredient of many edible fruits and berries. Sorbitol is now available from Atlas in mass production quantities for food use, derived from abundant farm produced sugars.

For many years, sorbitol has been known and used by dietary specialists and for the synthesis of Vitamin C (ascorbic acid). It is a member of the higher alcohol family of substances which includes other well-known edible compounds. The metabolism of sorbitol has been thoroughly studied. When used in appropriate quantities, sorbitol is wholesome and has a nutritive value equivalent to sugar.

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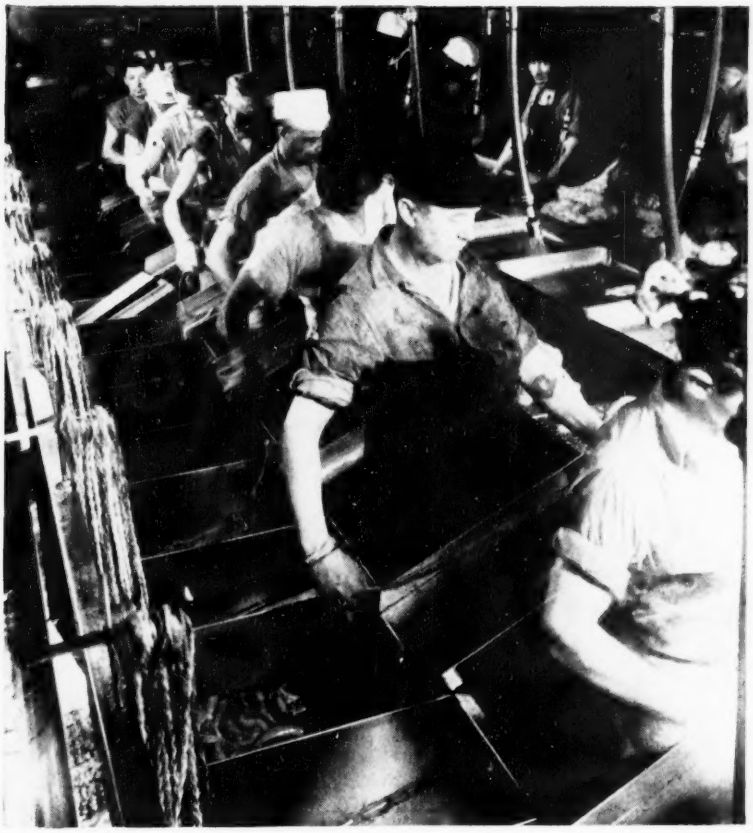

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Republic ENDURO Stainless Steel respects your rising "break-even point."

Equipment made from it can be trusted to stay on the job month after month, year after year—with an absolute minimum of down-time for repairs. Your daily clean up goes fast, takes few man-hours. And, ENDURO equipment safeguards the purity and quality of food products from start to finish.

Result: little down-time, extra production time, and a product you're proud to label.

ENDURO equipment offers a wide variety of qualities you want. It resists rust and corrosion . . . resists the action of food acids. It is strong and tough . . . resists denting and other mechanical damage. Stainless steel through and through, it has no surface plating to chip, peel or wear away. Its smooth, hard surface offers little foothold for contaminants. It does not contaminate metallically . . . adds no outside element to food products, takes nothing away. And, cleaning is simplicity itself . . . usually a quick wash and a rinse restores its like-new lustre.

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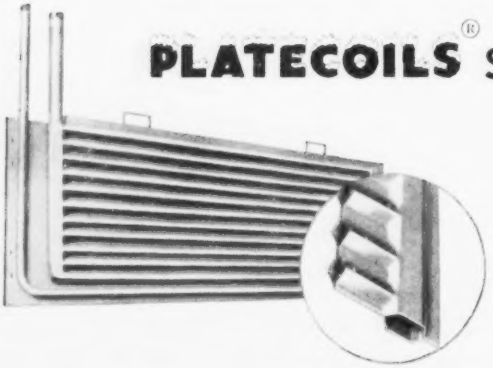
*CUT COSTS TO INCREASE PROFITS*



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The Platecoil heat transfer unit provides a new method of process heating or cooling that is faster and less costly. For example, a Platecoil has twice the surface area for a given space as pipe coil thus it provides much greater BTU transfer.

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For complete details ask for bulletin P-251.

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Refrigerated delivery can now be as automatic and dependable as you want it. Whether you have a truck or a trailer to refrigerate, whether you want semi-automatic or fully automatic operation, Kold-Hold will give you the practical answer to your truck problems. The addition of Kold-Trux "Mobilmatic" Highside Units to the proven line of Kold-Hold Lowsides provides a number of ways to refrigerate your trucks efficiently and economically. Kold-Trux Units can be used with a "Hydro-Pack" Blower, "Hold-Over", Thin "Hold-Over" or Quick Action Plates to supply completely automatic and thermostatically controlled refrigeration requiring no attention from the driver.

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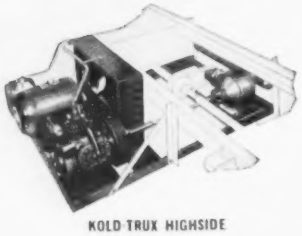

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# New Chop-Cut chops sausage meat instead of slicing it—has knife shaft on TIMKEN® bearings

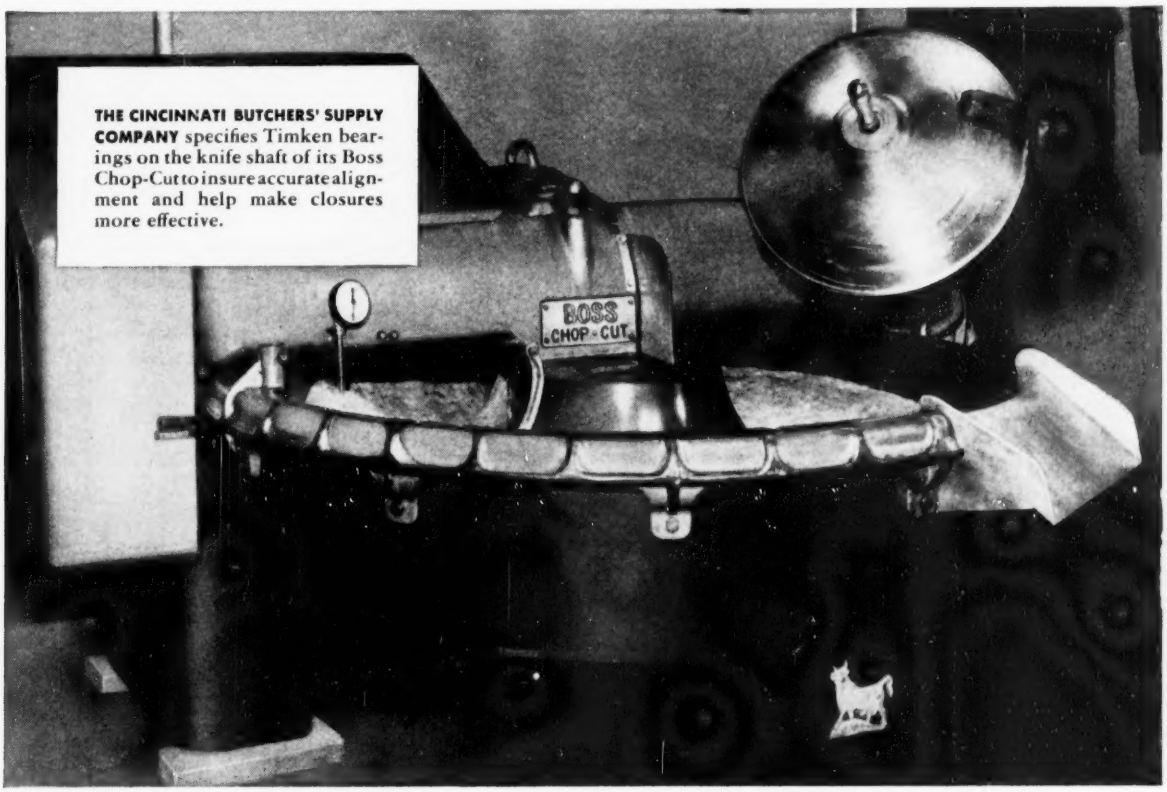
WITH its new knife design, this Boss Chop-Cut brings an entirely new cutting principle to sausage meat cutting equipment. It's the cool, chopping cut of a razor-edged cleaver rather than the draw-cut of a butcher knife. A more homogenous product with greater capacity for absorption is the result.

Since knife alignment and effective bearing seals are of extreme importance, Cincinnati Butchers' specifies Timken® tapered roller bearings for the knife shaft.

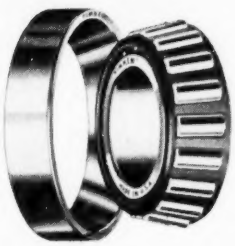
Due to their tapered construction, Timken bearings take radial and thrust loads in any combination. They hold the knife shaft in accurate alignment, maintain proper clearances. And since Timken bearings hold housings and shafts concentric, closures are more effective in preventing lubricant from leaking out and contaminating the meat.

In specifying Timken bearings, Cincinnati Butchers' is assured of getting bearings that provide more advantages than any other. Get these advantages in your food processing equipment, too. Look for the trade-mark "Timken" on every bearing in the equipment you build or buy. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN ROLLER BEARING — *This symbol on a product means its bearings are the best.*




**THE CINCINNATI BUTCHERS' SUPPLY COMPANY** specifies Timken bearings on the knife shaft of its Boss Chop-Cut to insure accurate alignment and help make closures more effective.



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**In many installations in the Food Processing Industry, ordinary steel valves seem adequate — for awhile. But later on corrosion takes its toll. Excessive maintenance and replacement begins.**

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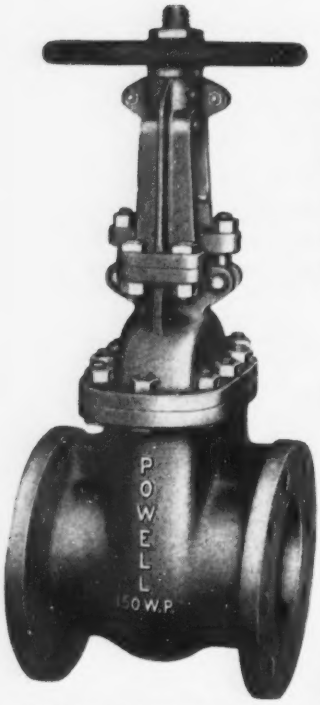


Fig. 2453-G — Large 150-pound Stainless Steel O. S. & Y. Gate Valve. Precision-fitted, accurately guided interchangeable solid or split wedge. Separable yoke arms in sizes 5" to 30", incl.

Fig. 1832—200-pound Stainless Steel Gate Valve with screwed-in bonnet. Sizes ¼" to 2", incl.

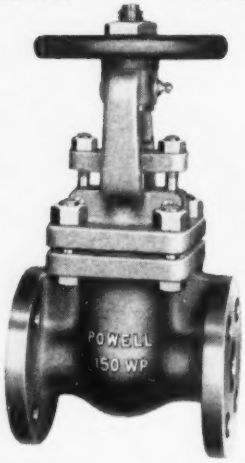


Fig. 2491 — 150-pound Stainless Steel O. S. & Y. Gate Valve with either solid or split wedge. Sizes ¼" to 2", inclusive. Also available with screwed ends.

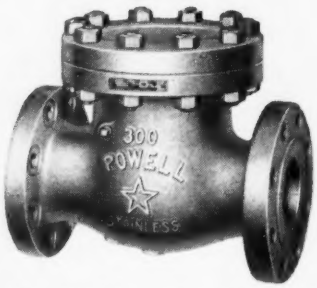


Fig. 3061 S. S. — 300-pound Stainless Steel Swing Check Valve. Made from a heavy steel valve pattern, it conforms to A.S.A. and A.P.I. Steel Valve Standards. These valves are available for 150 through 2500 pounds W.S.P.

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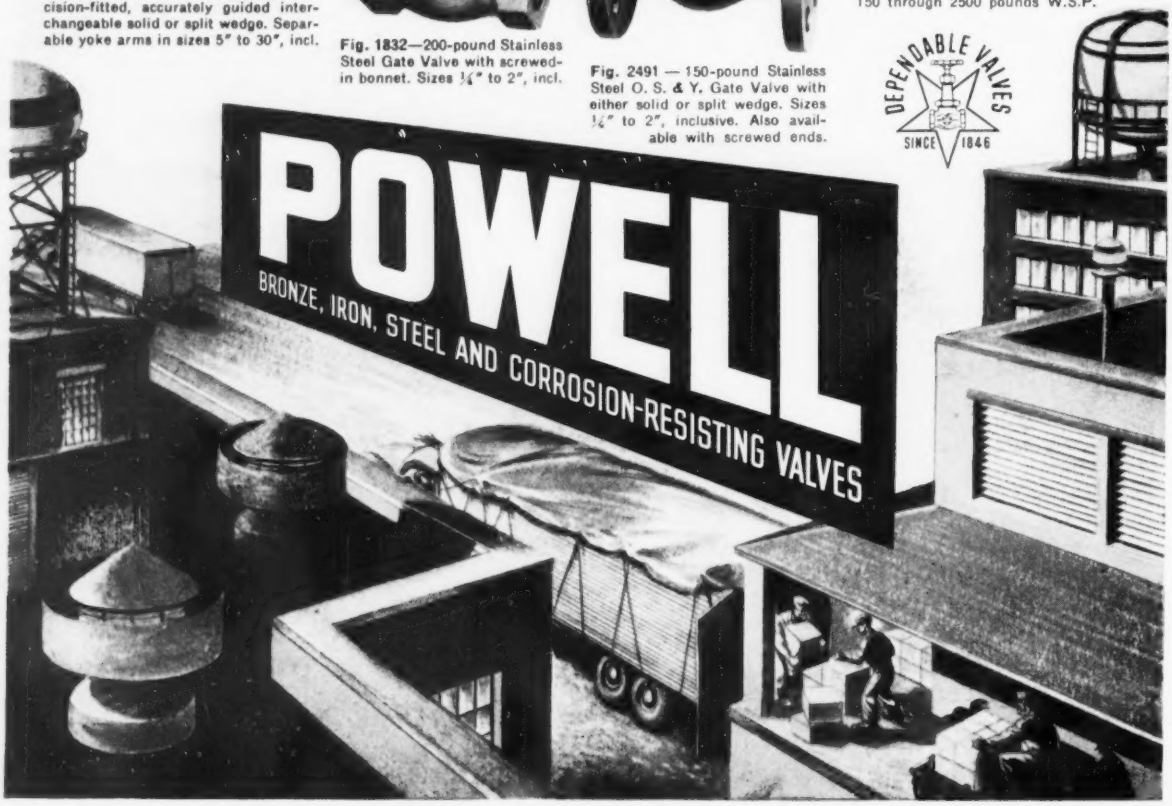

# BRITONS CAN HAVE PROSPERITY —If They Want It

What is required to get Britain, our key ally in the grand alliance of the free world, firmly back on her economic feet? The purpose of this message is to throw light on this crucial problem, which afflicts our other European allies also.

At the moment, Britain is enjoying a respite from the economic crises (of 1947, 1949 and 1951-52) which have plagued her postwar course. This respite may well continue for some time. But almost no one whose judgment is trustworthy believes that Britain has acquired sufficient economic strength to safeguard her against further economic crises in the years immediately ahead.

### Two British Views

New and clear light on what should be done to that end has recently been shed by two noteworthy British publications. One is a book, "We Too Can Prosper," by Graham Hutton, distinguished British economic writer and administrator. The other is an article, "The Riddle of Prosperity," published by THE (London) ECONOMIST, Europe's most eminent economic journal.

Combined, these two publications present in sharp relief the basic problem that must be handled successfully if Britain is to be safely solvent. As is implied by its title, ***the Hutton book demonstrates that Britain can be made prosperous by readily feasible procedures, patterned on what has been done in the United States, to increase its industrial efficiency. But, says THE ECONOMIST, with Mr. Hutton's book in mind, this is not the most basic problem, which is, "How shall we make the British people determined to be prosperous?"*** This is a problem of incentive or motivation.

Compared with that of the United States, average industrial efficiency in Britain, as in most of Western Europe, is low. In his book Mr. Hutton remarks that "fifty years ago an American industrial worker turned out roughly the same amount in a day as his opposite number in Britain, Germany or France. . . . Today, he turns out from two to five times as much."

***In large part it is this lag in output per hour or "productivity," as the technicians call it, which makes Britain and other key countries in Western Europe a continuing prey to economic crises.*** Moreover, the great disparity in productivity between the U.S.A. and most

of Western Europe is a major barrier to knitting the free world into a smoothly working economic whole. As one observer put it, "when the American economy catches a cold, the European economy gets pneumonia." This is largely because Europe is so much weaker in productive strength.

### No Shortage of Knowledge

Yet the knowledge which would enable the countries of Western Europe, and particularly Britain, to increase their industrial productivity has been mobilized and is readily available to them. It is with this process for Britain that Mr. Hutton's book is concerned. In the book he summarizes the findings and conclusions, virtually all of them unanimous, of 66 teams, composed of British industrial managers, technicians, shop workers and labor leaders. Over a period of three years these teams completed a comprehensive series of inspection and study trips in the United States under the sponsorship of the Anglo-American Council on Productivity. The product of that effort, he remarks, is "a set of documents the like of which, on such a scale and of such practical value, has never been seen in the history of international and cultural borrowing."

### Psychology the Key

From study of these documents, Mr. Hutton concludes that better capital equipment is the key technical ingredient of higher industrial productivity in Britain, and constitutes "the most urgent . . . need of British industry." But he finds that ***even without new capital equipment a "15% rise in productivity can still be achieved by reorganization of work," and that such an increase would "solve Britain's chief social and economic problems."***

Then why is not such an increase in productivity, demonstrated by the Anglo-American productivity teams to be so clearly within technical grasp, promptly forthcoming? Mr. Hutton, quoting one of the team reports, remarks that, ***"'the greatest obstacles to increased productivity are psychological rather than technical.'*** We have to deal first and foremost with men, not machines." And THE ECONOMIST, pursuing the line of inquiry suggested, reaches the conclusion that, by and large, the people of Britain do not want to prosper by being more efficient. THE ECONOMIST says:

> "The real secret of American productivity is that American society is imbued through and through with the desirability, the rightness, the morality of production. . . . But in Britain, if any moral feeling at all survives about economic matters, it is usually a vague suspicion that economic success is reprehensible and unworthy. From this difference in attitudes everything else follows."

***"How," asks THE ECONOMIST, "shall we set about restoring some belief in the rightness of effort, the morality of success?"*** For this question it has no ready answer. Neither have we. We are confident that the British people will neither be cajoled nor coerced into trying to match our productivity. Basically the problem seems to be to demonstrate clearly to them the truth of the proposition, set down by Graham Hutton, that "there is no goal, aim or end before a Good Society which the raising of that society's material productivity cannot render easier of achievement." Doing that in an old and settled country like Britain is obviously an extremely formidable undertaking. But ***until it is done, the crucial job of getting Britain and the rest of Western Europe firmly on its economic feet will remain to torment all of us.***

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## QUICK PRODUCT-FINDER


Accounting mach. .....232
Acid, citric .....26
Adhesives .....10, 232
Air-cond. equip. .....126, 210
  Dust collectors .....210
Antioxidants .....221
Bacon-cure mach. .....88
Bag-flattener .....163
Banding machines .....172
Banks .....207
Batteries .....125, 139
Bearings .....4
  Roller .....155
Belts, transmission .....144
Binders, loose-leaf .....232
Blenders .....28, 41
Blowers .....230
Boilers .....168, 230
Bundling mach. .....162
Bunkers, dry ice .....232
Burners, oil .....195, 230
Bushings .....14
Can-making mach. .....169
Can tester .....240
Cappers .....159
Catalase, enzyme .....175
Clarifiers .....136
Cleaning Equip.
  Jet-steam guns .....229
  Sprayer, rotary .....190
  Vacuum cleaner .....160
Cleaning mtls. .....179, 220
  For canning .....232
  Germicides .....175
  Sanitation data .....232
Closures .....140, 150, 187
Clutches .....167
Coatings, protective .....25
  Resinous .....221
Coders .....197, 213
Colloids .....223
Colors, food .....35
Cooker .....8
Cooker, pressure .....145
Coolers .....9
  Continuous .....166
Compressors .....34, 130, 138, 210, 230
Conduit, wiring .....232
Containers
  Bags .....186
  Boxes .....42, 127, 185, 241
  Cans .....90, 114
  Cartons .....101
  Chest .....182
  Drums .....82, 93
  Glass .....140, 150, 187
  Paper .....175
  Plastic .....182, 232
Controls .....96, 148
  Colorimeter .....163
  Combustion .....230
  Consistency .....120
  Dust .....30
  Edge-position .....230
  Furnace .....230
  Humidity .....230
  Liquid-level .....159
  Maturity tester .....225
  Metal detector .....230
  Meters .....231
  Relay, electronics .....165
  Scales .....187, 230
  Tags .....209
  Temperature .....18, 230
  Test devices .....231
  Tester, milk-tank .....171
  Thermometers .....218, 231
  Thermostatic .....230
  Water-problem .....232
Conveyor belting
  Cleats .....222
  Cotton .....191
  Metal .....209, 217
  Neoprene .....206
  Rubber .....144, 171


CONTINUED ON OTHER SIDE

← HERE'S A HANDY INDEX to equipment, supplies, and processes discussed in this issue

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## CIRCLE PAGE NUMBERS BELOW

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 2 | Vanillin | 30 | Dust Bul. 528 | 119 | Stainless steel | 148 | Contr. Cat. 500MP |
| 4a | Motors | 31 | Chain Wk. 2344 | 120 | Recorder Sheet 3.6-7 | 150a | Glass containers |
| 4b | Bearings | 32 | Tubing | 122 | Cork Wk. IN-122A | 150b | Screw caps |
| 6 | Dryer | 33 | Lubricants | 123 | Drums | 151 | Insulation mtl. |
| 8 | Cooker-cooler | 35 | Food colors | 124 | Trailer | 152 | Sorbitol |
| 10a | Adhesive Bul. 16 | 36 | Corn products | 125 | Batteries | 153 | Stainless steel |
| 10b | Can labeling bul. | 37a | Sep. Cat. C-1205-B | 126 | Air-cond. equip. | 154a | Coil Bul. P-251 |
| 12 | Mechanical tubing | 37b | Sep. Cat. C-5000-B | 127 | Boxes | 154b | Bul. KT-453 |
| 14 | All items shown | 38 | Tubing | 128 | Door Cat. 3 | 155 | Roller bearings |
| 14a | Sprockets | 39 | Vacuum equip. | 129 | Floor Bul. A-1 | 156 | Valves |
| 14b | Bushings | 40 | Flavors | 130 | Compressors | 159A | Capper |
| 14c | Sheaves | 41 | Blender | 131 | Alathon | 159B | Liquid-level contr. |
| 14d | Couplings | 42 | Folding cartons | 132 | Power system | 160A | Vacuum cleaner |
| 14e | Convyr. pulleys | 43 | Drives | 134 | Tin | 160B | Chain convyr. |
| 16 | Valves | 44 | Stainless steel | 135 | Foamglas | 160C | Bacon wrapper |
| 17 | Drive Cat. 2274 | 82 | Drums | 136 | Clarifiers | 161A | Vari-speed drive |
| 18 | Temp. controls | 84 | Fan Bul. 3533 | 137 | Myvatex | 161B | Sealer-labeler |
| 19 | Lubricant | 87 | Motors | 138 | Compressor | 161C | Vari-speed drive |
| 20 | Motors | 88 | Bacon-cure mach. | 139 | Batteries | 162 | Bundling mach. |
| 21 | Zest | 93 | Drums | 140a | Glass containers | 163A | Feeder |
| 22 | Gas | 94 | Vari-speed contr. | 140b | Closures | 163B | Valves |
| 23 | Convyr. Bk. 2289 | 96 | Metagraphic | 141 | Stainless steel | 163C | Bag-flattener |
| 24 | All items shown | 98 | Spice seasonings | 143 | Trucks | 163D | Fork-truck attachment |
| 24a | Fittings | 101 | Cartons | 144 | All items shown | 164 | Tube, Bul. T-77 |
| 24b | Valves | 106 | Ovens | 144a | Hose | 165A | Electronic relay |
| 24c | Pumps | 107 | Valves | 144b | V-belts | 165B | Walkway ladders |
| 24d | Tubing | 108 | Spisoresin | 144c | Convyr. belts | 165C | Truck forks |
| 26a | Citric acid | 109 | Motors | 144d | Transmission belts | 166 | Continuous cooler |
| 26b | Vitamin C | 113 | "JH" Interceptor | 145 | Cook Sheet H-12 | 167A | Mech. trouble detector |
| 26c | Vitamin $B_{12}$ | 114 | Cans | 146a | Drums | 167B | Pump |
| 28 | Blender Bul. 354-A | 116 | 2-way radio | 146b | Pails | 167C | Clutches |
| 29a | Motor Bul. 4-1p21 | 117 | Pump Bul. 17-A | 147 | Visqueen | 168 | Boilers |
| 29b | Motor Bul. 4-1p31 | 118 | HVP | | | | |

LISTINGS CONTINUED ON OTHER SIDE

Tear on dotted line

## INDEX to equipment, supplies and processes in this issue (See other side)


Conveyors .....180, 231
Cable .....231
Chain .....31, 160
Pneumatic ..... 173
Pulleys .....14
Screw-type .....28
Telescopic .....231
Tubular .....229, 231
Corn products .....36, 231
Coumarin substitute .....175
Coundings .....14
Dairy equip. .....228
Drainage system .....224
Demineralizer .....228
Detector, mech. trouble .....167
Disintegrators ..... ....206
Dispenser, chlorine .....228
Drives
Fluid-power .....43
Vari-speed ..17, 94, 161, 230
Dryers .....6
Rotary .....181
Spray .....230
Drums .....123, 146
Emulsifier .....137
Exposition, chem. .....211
Extinguishers, fire .....232
Fabricators .....212, 230
Fans .....84
Feeders .....163
Scale .....205
Fillers .....189
Filters .....226, 231
Dust .....30
Leaves .....186
Filtration data .....228
Fittings .....24, 232
Flavors .....40
Maple .....188
Meat .....108
Peach .....214
Raspberry .....239
Vanillin .....2
Floats, welded .....228
Freeze-drying .....228
Gas .....22
Generators .....225
Glassine .....232
Guards, hair .....232
Gum arabic .....231
Handling equip. .....231
Handling systems .....230
Heaters .....230
Hoists
Air .....231
Electric .....171
Hollow-screw processor .....242
Hose .....144
Inhibitor, rust .....231
Insulation mtls. .....151
Cork .....122, 201
Glass .....135
Pipe .....228
Interceptor, grease .....113
Labelers .....161, 197
Labels .....199
Ladders, walkway .....165
Loading equip. .....231
Lubricants .....19, 33, 202
Magnets, hopper .....225
Maintenance, floors .....196
Metals
Stainless steel ..44, 119, 141 153
Tin .....134
Monosodium glutamate .....21
Motors ..4, 20, 29, 87, 109-110 171, 178, 228
Gear .....228
Nozzles, spray ....219, 227, 232
Oil-burning systems .....228
Oils, essential .....98, 232
Ovens .....106
Overwraps
Cellophane .....186
Paper .....183
Packers, vibrating .....227
Pails .....146
Piping & Tubing....24, 38, 231
Mechanical .....12
Plastic .....164
Stainless .....32
Piston packings .....200
Plant-site .....170
Polyethylene .....131, 147
Power systems .....132, 232
Process equip., gen'l. .....228
Proteins, vegetable .....118
Pullers .....198
Pumps .....24, 167, 230, 232
Gear .....117, 230
Rotary .....213
Pulverizers .....228
Purifiers .....230
Radio, 2-way .....116
Refrigerants .....208
Refrigeration .....124
Refrigeration equip. ...210, 231
Compressors .....130, 138
Doors, cold-storage .....128
Platecoils .....154
Repellants, water .....231
Screens, sizing .....186
Sealer .....161
Seasonings .....98
Separators
Gravity .....154
Magnetic .....37, 194, 225
Sheaves .....14, 228
Silicones .....232
Sorbitol .. .....152
Spices .....98
Natural .....229
Sprockets .....14
Stacker, pallet .....231
Steam traps .....217
Strainers .....186, 211
Surfacing mtls., floors .....129
Tarpaulins .....173
Tractors .....231
Trucks
Attachments .....163
Commercial .....143, 231
Dumpers .....174
Forks .....166
Industrial .....178
Refrigeration .....154
Trailer .....124
Vacuum equip. .....89
Valves .....107, 142
Bronze .....16
Diaphgram .....163
Disk-type .....228
Electrical .....228
Oil .....228
Sanitary .....24
Stainless .....156
V-belts .....144, 228
Vitamins .....192
B12 .....26
C .....26, 208
Water treatment .....175
Wire cloth .....186
Wrappers .....204, 228
Bacon .....160
Frozen-food .....177


## CIRCLE PAGE NUMBERS HERE, FILL IN OTHER SIDE, AND MAIL

**LISTINGS CONTINUED FROM OTHER SIDE**

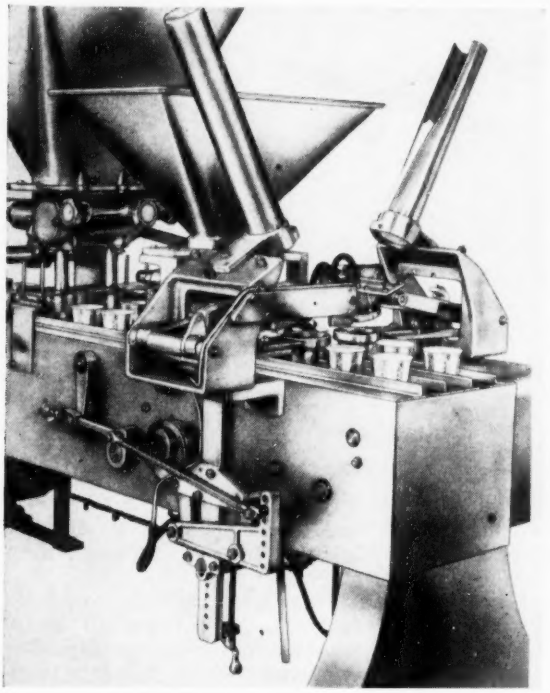
169A Colorimeter
169B Can-making mach.
170 Plant-site
171A Conveyor belt
171B Motor
171C Milk-tank tester
171D Electric hoist
172 Bonding mach.
173A Tarpaulins
173B Truck
173C Pneumatic convyr.
175A Water treatment
175B Germicide
175C Resilient paper
175D Protovanol "C"
175E Catalase 10
177 Wrapper
178 Motor Cat. 977
179 Cleaning mtls.
180 Conveyors
181 Dryer Bul. 531
182A Plastic container
182B Treasure chest
183 Packaging papers
184 (ad) Separators
185 (ad) Packaging bklt.
186 (ad) Wire cloth
186A Potato bag
186B Cello. overwrap
187 (ad) Scale Cat. 2001
187A Glass jars
187B Closure
188 Flavor Cat. C
189 Fillers
190 Rotary sprayer
191 Conveyor belting
194 Separators
195 Burner Bul. 51
196 Floor bul.
197 Coder-labeler
198 Puller Bul. 146
199 Labels
200a Bul. 4401
200b Bul. 4502
201 Cork insulation
202 Lubricants
203a Bul. 118
203b Bul. 119
204 Wrapper bklt.
205 Scale feeders
206a Disintegrators
206b Belt Bul. 18
207 Bank
208 Ascorbic acid
209a Convyr. belting
209b Control tags
210a Compressors
210b Dust collector
211a Strainer Bul. S-203
211b Exposition
212 Fabricator
213a Coder
213b Folder 53SE
214 Peach flavor
217a Trap Cat. 751
217b Convyr. belting
218 Temp. Cat. 200G
219 Nozzle Cats. 6A & 6C
220 Cleaning mtl.
221 Resin coating
222 Cleats
223 Cellofds
224 Drainage system
225a Maturity tester
225b Generator
225c Magnet Bul. B-204
226 Filters
227a Vibr. packers
227b Nozzle Cats. 22 & 23
228 (ad) Pipe insulation
228A Gear motors
228B Disk valves
228C Dairy equip.
228D Pulverizer
228E Float Bul. 753
228F Meters
228G Process equip.
228H Wrapper
228I Elec. valves
228J Filtration data
228K Valve Cat. 707A
228L Catalog 740
228M Oil-burning systems
228N Chlorine Cat. 61
228O Demineralizer Bul. 126
228P Power Cat. V-100
229a Jet-steam gun
229b Natural spices
229c Convyr. Bul. 953
230 (ad) Spray dryers
231a (ad) Corn products
231b (ad) Refrigeration equip
230A Blower Bul. B-6
230B Oil burners
230C Heater Bul. WC-101A
230D Bulk Bul. 0153
230E Fabricators
230F Pump Bul. 52B6615C
230G Compressor Bul. A-44
230H Purifier Bul. 401
230I Pump Bul. 17-A
230J Boiler Bul. 1219
230K Combustion contr.
230L Temp. Bul. 101
230M Contr. Cat. P1255
230N Testing cabinet
230O Contr. Bul. 141
230P Metal detector
230Q Vari-speed drive
230R Filling scale
230S Thermo. switch
232 (ad) Spray nozzle
231A Temp. Cat. 12-A-20
231B Filters
231C Meter Bul. 18
231D Testing devices
231E Catalog 535
231F Stacker Bul. 270X
231G Delivery trucks
231H Convyr. Cat. 53
231I Convyr. Bul. 40
231J Tractor
231K Convyr. Bul. 123
231L Tele. conveyors
231M Air hoist
231N Loading equip.
231O Gum arabic
231P Tube Cat. 200
231Q Rust inhibitor
231R Antioxidant Bul. 6
231S Water repellant
232A Bul. UA-530
232B Essential oils
232C Tube fittings
232D Adhesives
232E Dry ice bunkers
232F Plastic boxes
232G Glassine
232H Fire extinguishers
232I Silicones
232J Booklet LL234
232K Bulletin 7302
232L Power book
232M Sanitation guide
232N Canning sanitation
232O Accounting mach.
232P Hair guards
232Q Pumps
239 Raspberry flavor
240 Can tester
241 Boxes
242 Hollow-screw processor

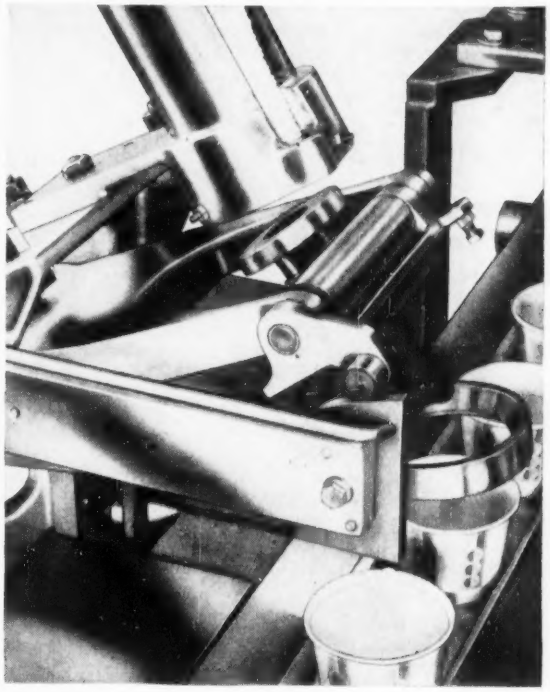
Coupon expires December 10, 1953

***Don't forget . . . fill in name and address on other side***

September 1953

# NEW EQUIPMENT & SUPPLIES





## New Vacuum Capper Is Versatile, Sanitary, Cuts Losses

Increased efficiency in dairy operations are reported with use of this highly versatile new vacuum capper. It handles all cups and lids normally used for cottage cheese, sour cream, salad and ice cream filling. Now, one capper replaces previous system of using several heads for different capping operations.

Unit permits complete changeover from any style or size lid to another very rapidly and at low cost. It is unnecessary to remove capper from machine. Changeovers require exchange of two small parts, and only adjustment necessary is adaption of capper to varying cup heights. This is done simply by means of a crank mechanism.

Capper efficiently handles disk, window, Continental Can metal, American Seal-Kap, and Sealright lids, as well as similar style lids in use in local areas.

Unit has been thoroughly tested in actual operations. In one of ice cream plants where testing was carried out performance records show that under the old system, "cripple" losses were 28 cups per hundred dozen, or approximately 840 lost cups per day. This loss was cut to ¼ the previous amount with use of a filler equipped with new capper.

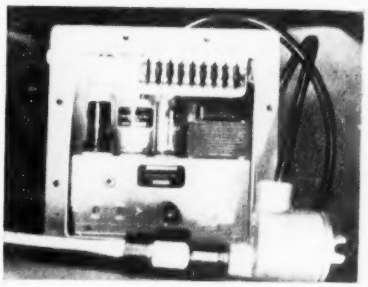
Increased efficiency of unit is due to elimination of cup jamming and content-spilling through simplified mechanism that does away with rising table at capper station. This is illustrated in accompanying photographs.

Vacuum action, with positive pick-up, also eliminates jamming due to variations in lid diameters, or thicknesses.

Another advantage claimed for new capper is increased sanitation. Capper never touches underside of lid and therefore never contacts product. —*Triangle Package Machinery Co., 6637 West Diversey Blvd., Chicago 35, Ill.*

Circle 159A on Reader Service Card

### Liquid-Level Controller Is Sensitive to Foam



Power unit in this new, liquid-level controller is a radio-frequency oscillator. Controller gives an on-off signal when level rises even with probe. Unit can be used to detect liquid or foam level and works well with viscous fluids.

Sensitivity may be adjusted so that instrument reacts to, or, if desired, ignores foam.

Controller reacts to a change in capacity when probe is covered by liquid or other flowable material. Capacity change causes a radio frequency oscillator to reduce or completely stop its oscillation when level gets above probe. Oscillation starts again when level falls below probe. This change in operation is used to generate a dc voltage signal which, through an amplifier, operates the relay.

Instrument is self-contained except for probe which is normally attached to it by a 52-in. long cable; however, this length may be extended up to 100 ft. Amplifier may be mounted in any remote area for convenience. Electrical signal can be transmitted

to any point for indication or control.

Probe itself, 6 in. long, is coated with ⅛-in. of Teflon. Threaded with 1-in. pipe threads, probe screws into vessel. Ac. power is required with instrument drawing 32w. — *Instruments, Inc., Wright Bldg., Tulsa, Okla.*

Circle 159B on Reader Service Card

## Industrial Vacuum Cleaner Has Protected Motor

Two new features, the electronic motor shutoff and stabilized brushes, have been added and are now standard on this light-weight industrial vacuum cleaner, the MCV-205B. The first prevents flooding of motor, while the second is reported to double brush life.

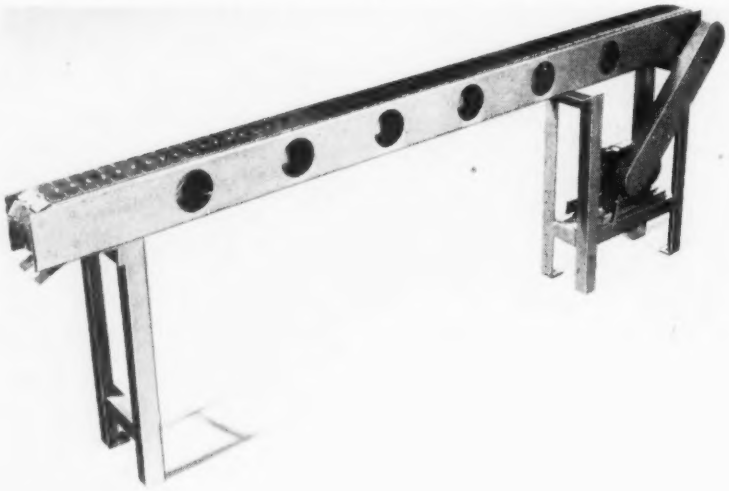
With electronic motor shutoff no water can enter vacuum blower and motor even though user fails to empty collection tank when filled. Two electrodes are mounted just below blower intake. A single drop of water crossing them on way into blower will open motor circuit and immediately stop machine.

After that, unit will not start again until tank has been emptied and electrodes dried, filter drained and motor switch turned off and back on.

New brush assembly design holds brushes at right angles to motor armature, causing them to wear evenly. Brushes last for 1,200 to 1,500 operating hours. When brushes wear to point where they may damage the armature, they cease to make contact and must be replaced before machine will operate. This safety feature protects motor armature from being damaged or burned out by contact with any metal parts of brush assembly.—*Multi-Clean Products, Inc., 2277 Ford Parkway, St. Paul 1.*

Circle 160A on Reader Service Card

## Access Ports Simplify Conveyor Cleaning



Of interest to bottlers and canners is this new power driven chain conveyor incorporating sanitary design features for fast and easy cleaning.

Conveyors are constructed of hot roll steel or stainless steel and are available with various drives, speeds and chain design to meet the requirements of installations and operations.

Clean-out holes are provided along both top sides for easy accessibility to underside of chain links and inside frame. Feature is essential where sanitation is involved.

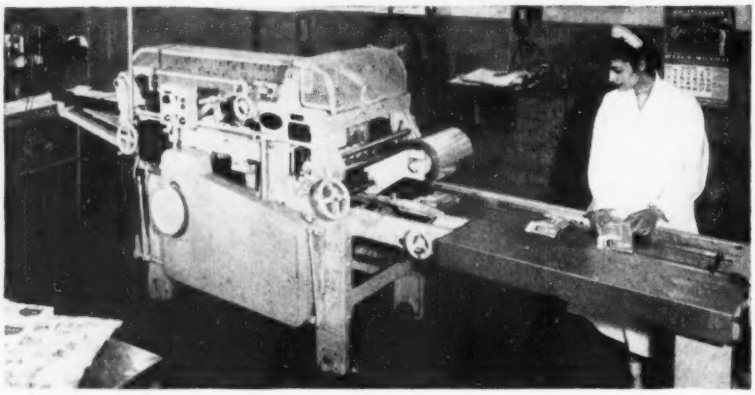
Conveyor is self-contained with drive mounted at one end of frame. This provides quick, easy changing of lines. Guide rails are available for bolting to top sides of frame to keep material on chain.

Flat, hinge-type chain provides a continuous level surface that eliminates hazardous balancing of product being conveyed. A take-up arrangement provides for removal of slack in chain. Each side of chain link rides on a smooth channel which provides a level surface to entire length of chain that is moving along top of frame.

Conveyors are available in various lengths to meet individual requirements and are built in 3½ and 4½ in. widths.—*Sage Equipment Co., 31 Essex St., Buffalo, N. Y.*

Circle 160B on Reader Service Card

## Bacon Wrapping Machine Produces Tight Package



"Tension wrap" and a double-seal are features reported for a new wrapping machine, the Model 201 for lb. and ½ lb. sliced bacon packages. Both features are said to insure a tightly wrapped package.

Tension wrap means the cellophane is held under tension during the heat sealing process, and excess air and oxygen are rolled out of the package just prior to sealing. In the double seal, the extended ends of the fold are

first sealed, then drawn underneath the card, and resealed to the package itself.

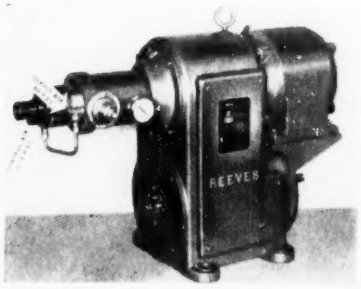
Machine operates in speed range of 40 to 50 packages per min. on either lb. or ½ lb. Adjustability has been built into machine for packages of different dimensions, ranging from 9 to 12 in. long, 5 to 8½ in. wide, and up to 1 in. thick. Changes for lb. to ½ lb. or vice versa, require less than one min. and changes from shorter to longer packages can be made in less than five min.

Machine is available in either a straight away model in which unwrapped packages enter at one end and are discharged at other, or reverse feed machine in which packages enter and are discharged at same end of machine.

An electric eye device can be furnished for registering a printed cellophane design on package. Machine can be prepared for handling sliced bacon on either flat bottom cards, or conventional bacon card with extended side and end flaps.—*Battle Creek Bread Wrapping Machine Co., Battle Creek, Mich.*

Circle 160C on Reader Service Card

## New Control Improves Vari-Speed Drive



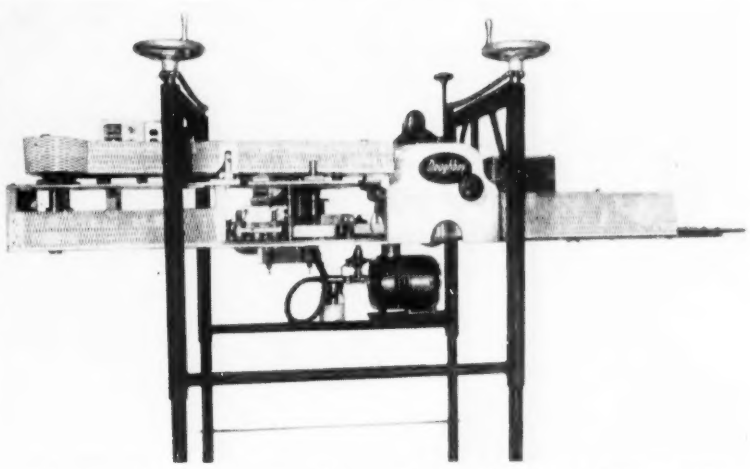

Addition of Conoflow Control permits Vari-Speed motordrives to regulate liquid levels in tanks—open or enclosed types. Further, unit makes it possible to use drive for automatically controlling flow proportioning systems of liquid, gas, grain.

Control is available on all integral hp. drives for use in conjunction with instrumentation air pressure of 3 to 15 psi. Drives, with new control have 6 to 1 maximum speed ranges on all units up to 25 hp.

Connection is made direct to unit cylinder on drive from a pneumatic controller. Cylinder is pre-lubricated. Outside lubrication is unnecesary. Control may be operated from present air supply in plant.—*Reeves Pulley Co., Columbus, Ind.*

Circle 161A on Reader Service Card

## Continuous Auto-Unit Seals, Labels Bags



Bakers, confectioners, and others will find interest in this new machine that automatically heat seals a cellophane bag airtight; picks up a printed label; attaches, folds and seals label to bag in a single continuous operation. An attachment will even code or price the bag.

Machine seals bag first, and then labels it, both in one continuous operation.

It is designed to insure positive closure, even with heavy duplex cellophane. Bags may even be folded before sealing and labeling.

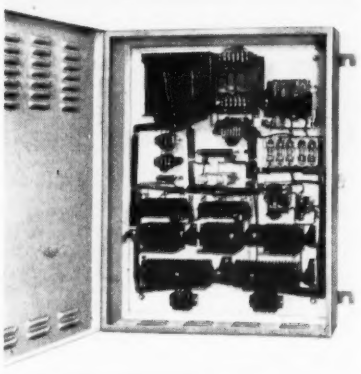
Thermoplastic labels from lightweight to heavier bristol stocks can be affixed with only moderate applications of heat and pressure. Labels are stated to emerge with smooth surfaces, preserving original full sales appeal value.

Labels may be sealed completely to bottom, evenly divided on both sides; or may be sealed only partially on front side, thereby leaving part of label free to accommodate various die cut designs and styles.

Unit handles labels to 6¾ in. long and 5 in. high, before folding. They are drawn pneumatically. Maximum width of seal front and back is 2 in.—*Doughboy Industries Inc., New Richmond, Wis.*

Circle 161B on Reader Service Card

## Magnetic Amplifier Unit Controls Motor Speeds



Accurate control of motor speeds is reported with this new unit, a magnetic amplifier adjustable speed drive without tubes of any sort.

Called the Franklin Drive, it is easily mounted and installed so that any machine operator can select the speed desired. Once set, speed remains nearly constant as load on motor changes. Even at low speed of 50 rpm. it does not drop off when load is applied, but holds practically constant to loads of twice the rated motor torque.

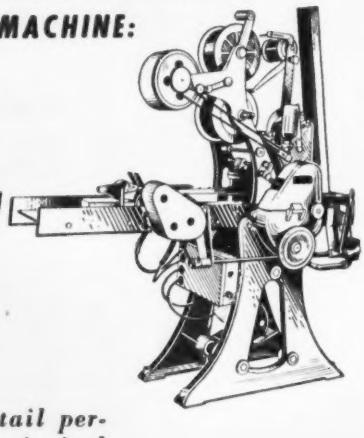
Drive contains no tubes, using only magnetic amplifiers and selenium rectifiers. These are rugged, static devices with long life so that drive will operate many years without attention. There are no adjustments to be made. Drive operates with supply voltages ranging from 200 to 250v.

Additional advantages claimed for magnetic amplifier design are instant starting, high overload capacity, and proper operation over a wide ambient temperature range. Drive should find wide application wherever space on the driven machine is limited. Control enclosure can be mounted in any out-of-the-way location. Control station, containing the start-stop buttons and the speed control knob, can be

# FROM HEADACHES

## SINCE THE BAYER COMPANY DIVISION TURNED TO SCANDIA AUTOMATIC BUNDLING MACHINES

**YOUR PRODUCT, TOO, DESERVES THE BENEFITS OF THE *SCANDIA* AUTOMATIC BUNDLING MACHINE:**



- **VERSATILITY**
  *bundles in Kraft, glassines or cellophane*
- **REDUCED COSTS**
  *greater production and shipping costs reduced*
- **IMPROVED APPEARANCE**
  *custom wrapped; permits mass displays*
- **COMPACTNESS**
  *machine occupies less factory space*

*Your inquiries concerning detail performance characteristics are invited.*

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*Manufacturers of Better Packaging Machinery*

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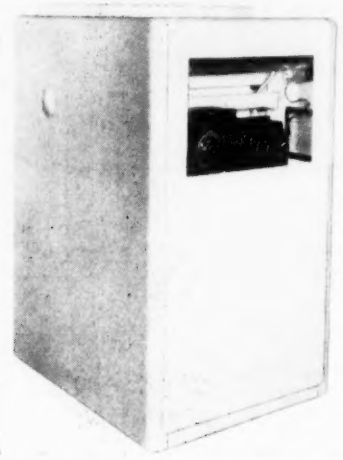
mounted in any position convenient for the machine operator.

Model E-1 includes a standard 230v. d.c. motor with a speed range from 49 to 2,450 rpm (50:1) and is rated at ¾ hp. at maximum speed. Controls are constructed in accordance with Machine Tool Electrical Standards. Wall mounted enclosure is NEMA Type I, ventilated. A front operating disconnect switch is mechanically interlocked to door to provide safety and reduce installation time.—*Franklin Control Corp., 1975 S. Allis St., Milwaukee 7.*

Circle 161C on Reader Service Card

## Gravimetric Feeder Unit For Smaller Plants



A complete, new development extending advantage of gravimetric feeders to smaller plants is offered in small Model GLW-0 Feeder.

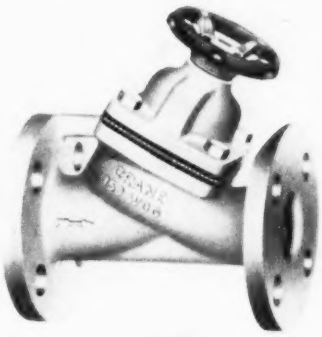
Size 0 Feeder is designed for use where accurate, low rates of feed, limited floor space and low cost equipment are essential factors. Compact in design it requires only 26x33 in. floor area and 25 in. front and back for door clearance.

Feeder is accurate to 99 percent delivering either powdered, granular or lump material up to ¾ in. size. Its wide feed range permits 0-to-100 percent settings for any capacity within a minimum of 0.25 to a maximum of 100 lb. per hr. A totalizer registers in lb. the total amount of feed.

Operation is simple. Rate is set by a single dial. No calibration is required; no timing or catching of samples is necessary to determine rate of feed. Its operation is dustless. As much as 5 cu. ft. of material can be stored in hopper.—*Omega Machine Co., 345 Harris Ave., Providence, R. I.*

Circle 163A on Reader Service Card

## Diaphragm Valves Offered In Various Materials



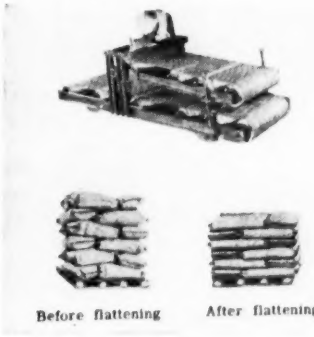
Added to the line of packless diaphragm valves are several new body, diaphragm, and lining materials.

These valves are now regularly available with cast iron, brass, aluminum, or 18-8 Mo. bodies and disk holders, also with diaphragms and disk inserts of Neoprene, Buna-N, and natural hard rubber linings.

Outstanding feature of diaphragm valves is the separate diaphragm and disk construction. Since diaphragm is not used for seating, it is not subjected to cutting, crushing, and abrasion that lead to rapid wear. Closure of independent disk will prevent escape of line fluids even if diaphragm should fail.—*Crane Co., 836 S. Michigan Ave., Chicago 5.*

Circle 163B on Reader Service Card

## Portable Bag-Flattener Simplifies Handling




Savings up to 30 percent in warehouse and shipping space are claimed with use of bag flattener. Additional advantages cited are: Reduced damage in transit; increased pallet loads; and neatly formed, easy to handle bags.

Here's how it operates: Burlap or paper bags are carried between two power-driven conveyors consisting of endless steel springs operating over grooved rollers. Leveling action takes place, creating a uniform thickness throughout bag as it passes between the staggered upper and lower rollers. Flattener is portable, can be placed right at packers or at end of conveyor. Dimensions are: Width 3½ ft.; length 9½ ft.—*Power-Curve Conveyor Co., 1421 Court Place, P. O. Box 1146, Denver.*

Circle 163C on Reader Service Card

## Fork Attachment Speeds Citrus Crate Handling

This new attachment for fork trucks is designed to give citrus industry a big lift.

Developed primarily for pallet-less handling of field crates loaded with oranges and grapefruit, new hydraulically actuated clamp can pick up eight full crates.

Unit which mounts on fork truck has hardened steel spring mounted feet which slide under ends of crate and support load without excessive clamping pressure.

Carrying a full load of eight crates, clamp attached to a truck can negotiate a 90 deg. turn in a 59-in. intersecting aisle, or make a right angle turn for stacking in an aisle 107 in. wide.

Load nests tight against backrest, insuring stable transportation because crates are supported by feet at forward ends. Clamp body and backrest are welded to form an integral unit. Clamp arms are one piece and welded to body. Installation of clamp does not affect standard lift, tilt or speed of truck.—*Yale and Towne Mfg. Co., Roosevelt Blvd. and Haldeman Ave., Philadelphia 15, Pa.*

Circle 163D on Reader Service Card

**Purity and Flavor of LeRoy's "Long Treat" Ice Cream Sandwiches**

# Safeguarded by TYGON TUBING

When LeRoy Foods, Inc., Brooklyn, N. Y., developed their patented process for making ice cream sandwiches, quality-conscious management faced a problem of major importance. LeRoy's process is based on the transmission of semi-solid ice cream directly from a continuous freezer to stainless steel filler nozzles which in turn fill pre-assembled boxed sandwiches.

Conventional tubings for transmission of the ice cream proved completely unsuitable. At the suggestion of one of the public health authorities, Tygon flexible plastic Tubing was tried. It worked perfectly.

Tygon answered LeRoy's needs on every count: it was completely non-toxic and non-contaminating, free from any tendency to impart taste or odor to ice cream; Tygon was glass clear, gave visible evidence of cleanliness; Tygon could be easily disassembled, easily and safely cleaned; and Tygon was flexible—gave operators complete freedom of action.

This exclusive process of LeRoy Foods, Inc., enables three operators to turn out 400 dozen "Long Treat" Ice Cream Sandwiches per hour.

If you process liquid or semi-solid foods there is a place in your operations where you can use Tygon Tubing to advantage. Bulletin T-77 free on request, tells the complete story. Write for it today.

90-D

**U. S. STONEWARE • Akron 9, Ohio**

PLASTICS & SYNTHETICS DIVISION

## Sensitivity Controlled On Electronic Relay

This new electronic relay is reported highly sensitive to resistance changes and can be varied by a stepless dial.

Relay may be used to start or stop a fractional hp. motor directly upon a contact making ammeter, voltmeter, or wattmeter reaches a required meter reading. Other uses include liquid-level control, sorting of small parts, and operating of lights, solenoids, and contractors wherever there is sufficient change in the resistance of a circuit.

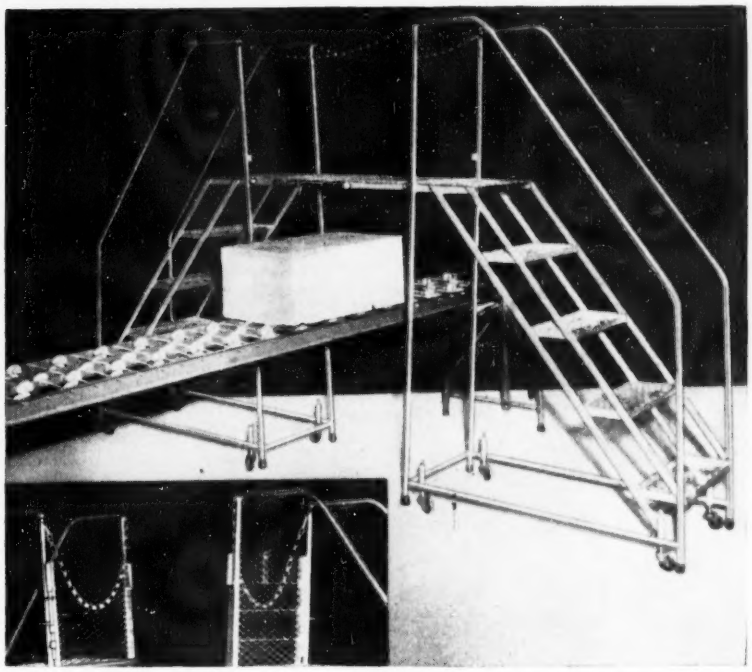
Two single-pole, double-throw contacts permit control of independent systems, and a simple jumper change sets relay for normal or reversed operation. Selection of most favorable relay operating point is facilitated through a sensitivity dial located on front of unit. Dial may be remotely controlled from as far away as 500 ft.

Power requirements are 115/23v. a.c. 50/60 cycles, and should not exceed 10v. amp. Contact rating in amp. is: Inrush, 30; carry, 10; break 10; on normally closed contacts and 5 on normally open contacts. Break inductive load for 125v. d.c. is 0.2 amp. normally open and 0.1 normally closed; for 250v. d.c. it is 0.1 normally open and 0.05 normally closed. Time delay, depending somewhat on dial setting and external resistance value, is rated at 5 milli-seconds minimum.

Enclosure is both weather resistant and dust tight (NEMA Type III and V), making it suitable for both indoor and outdoor installations. Enclosure measures approximately 10 x 6¼ x 4⅞ in.—*General Electric Co., Schenectady 5, N. Y.*

Circle 165A on Reader Service Card

## Walkway-Equipped Ladders Used Two Ways

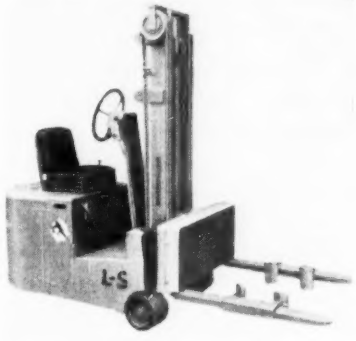


Passage blocks and inaccessible areas above conveyor systems are easily eliminated with use of dual safety step ladders equipped with a connecting walkway. When not needed as cross-over, walkway can be folded up so that ladders may be used for normal requirements.

Standard size ladders are available for practically any required height. Built of steel, ladders are rugged and long-lived. Two types are supplied. One has rubber tipped legs only for permanent or semipermanent installation. Other is equipped with casters for easy movement. Casters automatically retract when a person steps on ladder so that rubber tipped legs firmly engage floor.—*Ballmore Co., Wayne, Pa.*

Circle 165B on Reader Service Card

## Clamping Attachment Ups Truck's Versatility



Increased versatility in fork lift operation is gained with use of this new attachment — hydraulically adjustable clamping forks.

Device, designed for handling of drums, barrels or similar objects through means of clamping pressure, permits switching over to conventional pallet handling without adjustments of any kind.

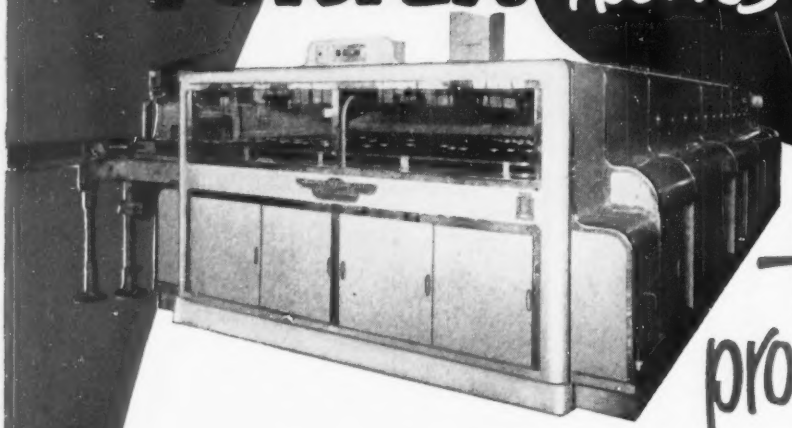
Unit can be placed on any of maker's rider type electric fork trucks from 1,000 to 4,000 capacity units or high-lift walkies.

If barrels or drums handled have adequate side-wall strength, it is possible to clamp them without using the clamping pads. A curved cut-out on the inside of each fork is sufficient to hold the drum in position. With the slip-on pads, clamping pressure is distributed over a large enough area to prevent crushing fiber drums or wooden barrels.

Maneuverability of trucks and their ability to operate in minimum aisle space add to efficiency of an operation where adjustable clamping forks are used.—*Lewis-Shepard, Watertown, Mass.*

Circle 165C on Reader Service Card

# how the B-W VORTEX Assures AUTOMATIC EFFICIENT ECONOMICAL food processing



The famous Barry-Wehmiller Vortex is today being successfully used by more and more food processors in a wide variety of applications. Whether your processing requirements include cooling, freezing, pasteurizing or exhausting, you'll find the Vortex perfectly adapted to glass or metal containers for foods or beverages.

Operation of the Vortex is entirely automatic and continuous. Accurate dial control of operating speed assures correct processing time. Compact design conserves valuable floor space, and its gleaming, modern appearance appeals to the eye.

Engineering advantages include the patented B-W "walking beam" conveyor which moves containers through the process zone, yet the conveyor itself remains at the same temperature throughout the operation. This eliminates the usual cost of heating, cooling or re-heating the conveyor system. Hydraulic drive eliminates many gears and cam movements and has extremely low power requirements.

*For many years of the most efficient, economical processing in your plant, specify the Vortex. Write for complete data and Bulletin 302 today.*

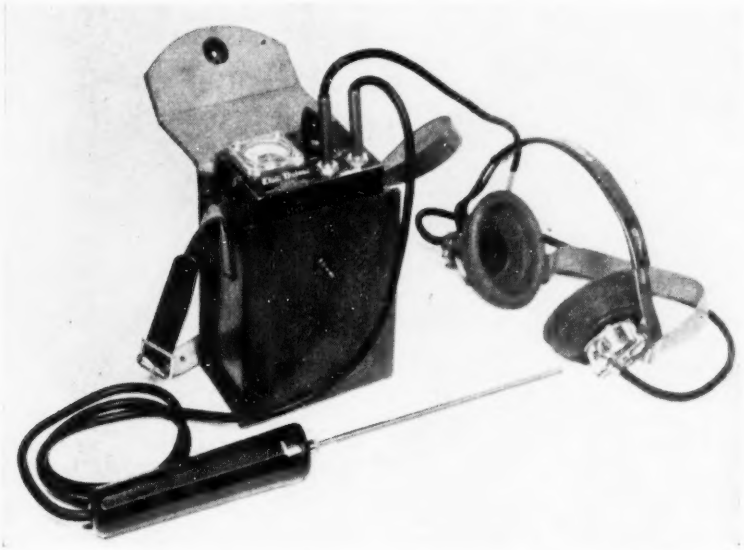
SUN NEVER SETS ON B-W BOTTLE CLEANERS PASTEURIZERS & PROCESSORS

**BARRY-WEHMILLER MACHINERY CO.**

4660 WEST FLORISSANT AVENUE · ST. LOUIS 15, MO.

IN GREAT BRITAIN BARRY-WEHMILLER MACHINERY CO. LTD MILL GREEN ROAD

## Portable Unit Detects Mechanical Trouble



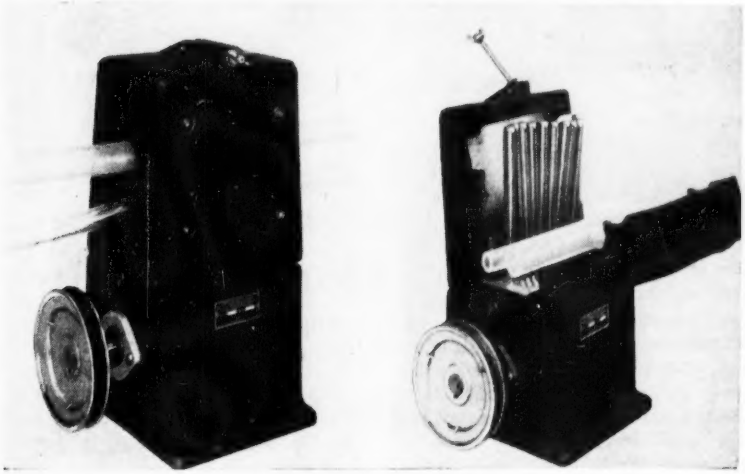
Noise sources in all types of mechanical equipment can be located with use of new portable electronic instrument, a practical aid in maintenance, testing and inspection.

Unit, known as Elec-Detec Model V, includes a millammeter for checking sound impulses visually, in addition to standard headphones for audible operation. Combination is stated to enable operator to "see as well as hear" location of source of trouble in bearings, pistons, gears, ratchets, cams, clutches and other moving parts.

Accurate performance of unit, is claimed by use of a highly stable germanium crystal diode in the circuit. Crystal serves to rectify current to record electrical impulses accurately on d.c. milliammeter, and to provide wide frequency response required, maker points out.—*Anco Instrument Div., American Name Plate & Mfg. Co., 4254 W. Arlington St., Chicago 24.*

Circle 167A on Reader Service Card

## Pump Employs Pressure Fingers to Move Liquids



This new model pump, handles tubing up to 1 in. dia. Further, unit has a hinged top so that without disconnecting either end of tubing, it can be placed against fingers for pumping.

Action of pump comes from a series of chrome plated steel "fingers" exerting pressure on flexible tubing.

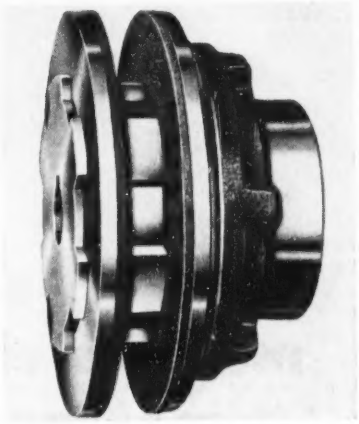
No connections at pump are necessary. Liquid is pumped from one receptacle to another by placing connecting tubing in unit. Fluid in tubing never comes in contact with pump. There can be no contamination or corrosion from contact with metal parts.

Unit will pump liquids, gases or solids in solution. It will handle from 45 to 250 gph. at 500 rpm. Different tubing sizes can be used simultaneously. Several fluids may be pumped in proportion, simultaneously and independently. Tubing recommended for use can be supplied by manufacturer.

Aluminum case stands 12 in. high with a 5-in. pulley on slide.—*Sigmamotor, Inc., N. Main St., Middleport, N. Y.*

Circle 167B on Reader Service Card

## Torque-Limiting Clutches Protect Machine Drives



Overload protection for machine drives is said provided by these new adjustable torque-limiting clutches.

These compact slip-type friction clutches act as automatic shear pin mechanisms and avoid loss of time and labor required to insert new shear pins.

They are particularly adapted to roller chain drives. Other types of rotating members such as gears, pulleys and sheaves can also be used with the new clutches. Clutches consist of a steel body, two steel clutch plates, two

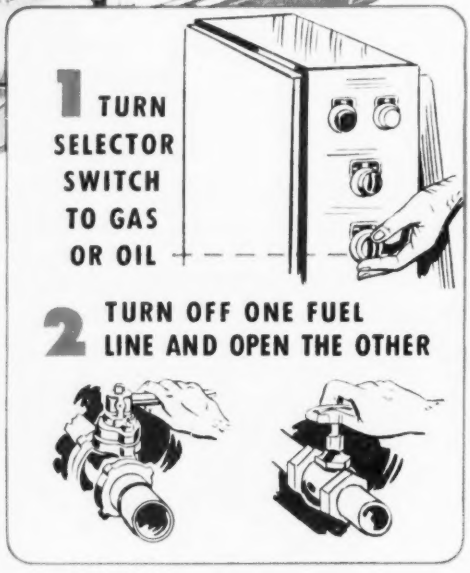
**Want more information?**

**It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard—page 157. Then sign at the bottom and mail.**

**For your convenience, too, items in this department are listed and keyed in the Reader Service Section.**

# NOW... interchange Gas and Oil firing in *10 seconds*

Modern Cleaver-Brooks Model LR Steam Boiler Equipped with Exclusive Cleaver-Brooks "10-second conversion" Combination GAS and/or OIL Burner




## TWO, simple motions eliminate time-consuming change-over

Now you can use oil or gas at the flick of a switch! This exclusive new Cleaver-Brooks development permits changeover from oil to gas or vice versa in only 10 seconds.

That's because the Cleaver-Brooks Combination Gas and/or Oil Fired Boiler operates on gas *with the oil burner in place.* Simply flipping a selector switch on the control panel to either gas *or* oil sets the proper circuit in action. Turning the convenient fuel supply valves completes the entire changeover — and in 10 seconds or less!

To gas users in all parts of the country — and in particular areas where local requirements demand immediate changeover — this exceptional fuel flexibility can be an important factor in determining your overall operating economy.

Ten-second conversion, like 4-pass construction, self-contained design, guaranteed 80% efficiency, is another "plus" feature pioneered by Cleaver-Brooks. It demonstrates Cleaver-Brooks' continuing effort to bring steam users even greater flexibility and reduced operating costs.

Consider Cleaver-Brooks boilers for simplifying your operation. Automatic firing on oil, gas or combination oil/gas fuels, plus extra conveniences, assure greatest investment return. Write for catalog.

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Builders of Equipment for the Generation and Utilization of Heat • Steam Boilers • Oil and Bitumen Tank-Car Heaters • Distillation Equipment • Oil and Gas-Fired Conversion Burners

BOILERS — STEAM OR HOT WATER — FOR HEATING AND PROCESSING, IN SIZES FROM 15 TO 500 HP, 15 TO 250 PSI

friction disks, a Belleville clutch spring and a cast iron adjusting nut. Rotating member is held between friction disks through spring pressure exerted on clutch plates that slide on splines on hub. Torque setting of clutch is obtained by adjusting spring tension with threaded thumb nut.

Compact design is made possible through use of a Belleville spring, permitting much shorter overall clutch lengths.

Slip-type torque-limiting friction clutches provide several advantages: (1) Overload setting can be readily determined without mutilating a component; (2) clutch is tamper-proof in that maximum setting cannot be exceeded; (3) time losses encountered in repairing shear pin devices are eliminated and (4) cost of replacing shear pins is avoided.

Clutches are mounted on driveshafts with a standard keyway and setscrew arrangement. They are stated to be easily disassembled by removing the adjusting nut, which permits the spring, clutch plates, friction material and rotating member to be slid off over the hub.

In operation, rotating member breaks away from disks at overload torque setting. Then rotating member remains stationary in relation to clutch hub with friction torque of clutch remaining at from ¾ to ¼ the overload setting. Thus, clutch rotating member is rendered inoperative until drive is shut off and overload condition corrected.

Clutches are made in 4½, 5½, and 6½-in. dia. sizes with rating of 55, 121.5 and 260 ft.-lb. respectively. Maximum bores (with std. keyways) are 1, 1½ and 2½ in. Overall lengths are 2-9/16, 3, and 3-⅞ in. Hub OD's are 2.000, 2.625 and 4.250 in.—*Morse Chain Co., 7601 Central Ave., Detroit.*

Circle 167C on Reader Service Card

## Two Knob Colorimeter Is Easy to Operate

Color densities and percentage of light transmission in quantitative analyses can be readily determined with use of this new model monochromatic colorimeter.

Instrument is designed for use in food processing and production control, oils and fats analyses.

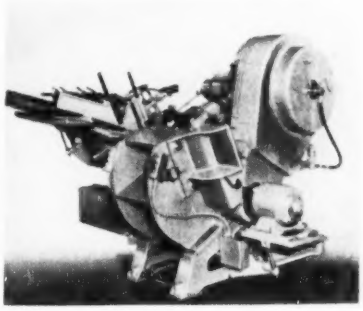
It employs transmission-type interference filters which provide high spectral purity, insuring detection of small absorption bands in transmission curve. Because filters utilize metallic films evaporated on glass surfaces, they will not deteriorate with age.

New colorimeter is simple to operate since two convenient knobs give complete control. A dual purpose filter holder accommodates either 2 x 2 in. or 1 x 1 in. filters. When holder is withdrawn from light path, light is automatically cut off from photoelectric cell, thereby avoiding damage to sensitive element.

Scale gives direct transmission and density readings by means of a floating spotlight. Precalibrations have been selected to cover more commonly employed clinical procedures.—*Bausch & Lomb Optical Co., 635 St. Paul St., Rochester, N. Y.*

Circle 169A on Reader Service Card

## New Strip Feed Press Runs at High Speeds



This No. 401 strip feed press for high speed production of can ends, screw caps, and other light stampings has been newly redesigned to greatly increase speed with multiple dies. In addition, continuous feed stack provides for at least 1 hr. production run before reloading. Rated capacity of machine is 25 tons.

Features of new machine include an improved frame design using a welded steel structure by means of which perfect alignment is maintained without tie bars. Use of a Fawick Air-Flex clutch and brake directly on crankshaft assures smooth starting, protection to crankshaft and dies, and practically instantaneous stopping. They are also factors in minimizing maintenance.

Sectional friction shoes in clutch, applied by an air-inflated tube assure uniform pressure around drum, eliminate possibility of improper adjustment, and to make wear compensation automatic.

Brake is disengaged instantly by air pressure as clutch engages and brake is spring-actuated at instant of clutch engagement. Press is stopped automatically in the event of air supply failure.

Adjustable vacuum cut-off has been speeded up and simplified. Air supply line is completely closed before short lines to vacuum cups are opened to atmosphere for breaking vacuum. Unit operates in conjunction with cross feed which takes strips from suction cups into and under finger bar in table. Press operates on its own built-in vacuum system, or on any regular shop system.

Safety for operator is provided through controls requiring two hands and an open electric circuit when flywheel guard door is open. Automatic lubrication is optional. — *Baldwin-Lima-Hamilton Corp., Hamilton, Ohio.*

Circle 169B on Reader Service Card

# 6 REASONS why you should investigate this plant-site . . .

400 acres of level Burlington-owned land, free from overflow, on the bank of a major river. This ground offers an excellent location for a chemical or food processing plant. Available as a whole or in part. We will be glad to give you full information on this and other plant-sites . . . in complete confidence, of course.

1. **CENTRAL LOCATION.** Near important markets and sources of raw materials.
2. **AMPLE WATER OF EXCELLENT QUALITY.** Large-volume wells easily drilled. City water available.
3. **EFFICIENT TRANSPORTATION.** Main line rail service in all directions. Good highway facilities.
4. **ADEQUATE UTILITIES.** Good electric and natural gas service.
5. **CONVENIENT WASTE DISPOSAL**, by discharge into river or city sewer.
6. **GOOD LABOR SUPPLY.** Near major city, providing reservoir of skilled and unskilled labor. Good living conditions.

***For complete information,*** *on this or other industrial sites in the 14 states we serve, write*

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Way of the Zephyrs
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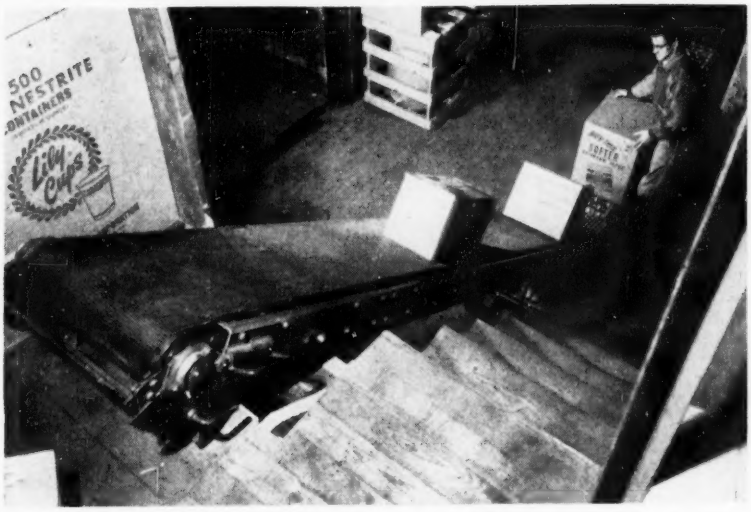
## Belt Carries Packages on 55 Deg. Slope




Packages and cartons can be moved up or down grades as steep as 55 deg. on a new conveyor belt recently developed. Steep angle operation means savings in space wherever containers are belt-conveyed.

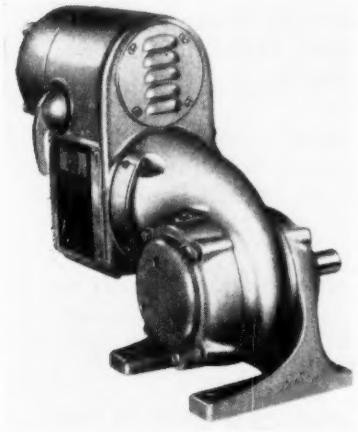
Called "Griptop," new belt has a special ridged and cross-cut rubber surface which provides extra gripping power needed to operate on grades above 30 deg. Flexible, molded rubber ridges are parallel and run across belt width. They stand ¼ in. high and are cross-cut to form tiny gripping blocks.

As an example of space savings now possible with new belt, makers engineers state that installation at 45 deg. requires 42 percent less floor space than one at 30 deg. Further, conveyors length is shortened by 29 per cent, resulting in lower belt replacement costs.

Belt is said to possess self-cleaning action. As belt travels around pulleys, ridges of tiny rubber blocks fan out and release material which may have lodged in grooves. Uniformity of design allows cover to wear at a constant rate.—*B. F. Goodrich Co., Akron.*

Circle 171A on Reader Service Card

## Right-Angle Unit Has Low, Variable Speeds



This compact unit—comprised of a fractional hp. Varidrive motor in combination with a right-angle Syncrogear—is designed for applications requiring low, variable speeds with a right-angle hook up.

Called Type VA-GW, units are offered in ¼, ⅓, ½ and ¾ hp. with speed variations up to 10:1.

Units are suitable to such applications as conveyors—especially since most of worm-gear ratios are self-locking when not in use. Full range of speeds is achieved by turning control handle within an arc of 300 deg. Variable speed transmission is of V-belt type. Speed changes as slight as 1 rpm. may be effected while motor is operating.

Syncrogear employs cantilever principle of mounting all parts on a sturdy, pyramidal base. There is no transmission of mounting stresses through the unit assembly.

Gear and bearing alignment stay permanently accurate, as originally installed.—*U. S. Electrical Motors Inc., Box 2058, Terminal Annex, Los Angeles 54.*

Circle 171B on Reader Service Card

## Bulk Milk Tank Tester Gives Accurate Sample

Convenient and easy bulk milk tank testing is claimed with use of new L/W Model 40 unit.

Tester, 40 in. long, is termed proper length. Its tubular plunger rod combines durable construction with lightweight, and butterfat resistant neoprene plunger assures trouble-free performance. Designed to operate faster, unit is stated to deliver an accurate 16 oz. measurement every time.

Unit comes fully equipped with disk retainer and Protect-O-Can head.—*Langenskamp-Wheeler Dairy Supply Div., 1266 Shelby St., Indianapolis 3, Ind.*

Circle 171C on Reader Service Card

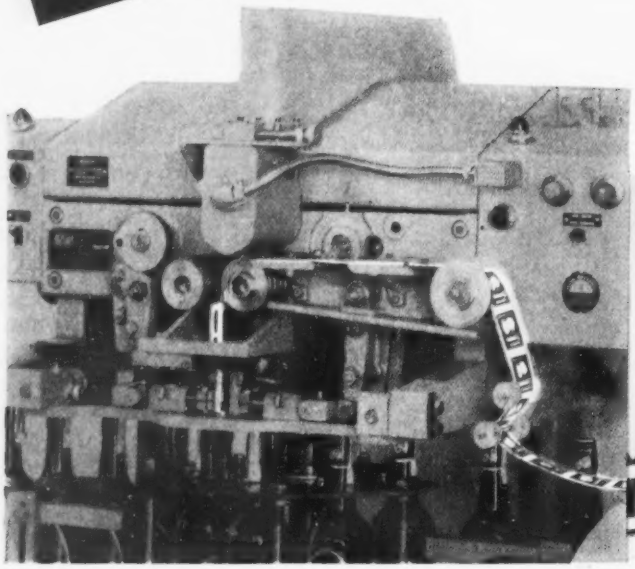
## Compact Electric Hoist Speedily Lifts Loads

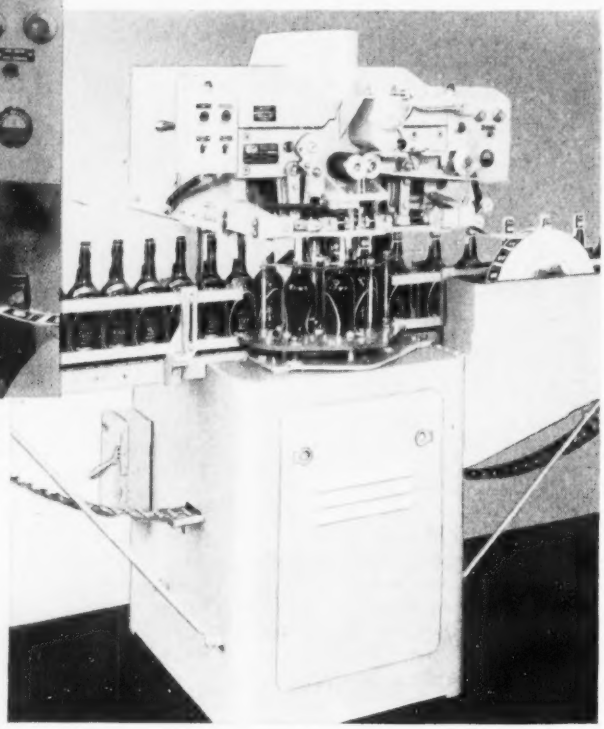
This new model Zip-Lift electric hoist with rope control comes in two models with lifting capacities of 500 and 1,000 lb. Hoisting rates are 25 and 13 f.p.m. Both models are available with 12 and 18 ft. lift. New hoist operates with "One-Hand" rope control. Hoist is also designed with a weight-overload safety factor of five.

Wire rope hoisting will be used because of its wide range of side pull and safety from hidden wear. Other features included are: Double brakes; oil bath lubrication; fully-enclosed construction; and greased-packed motor bearings.—*Harnischfeger Corp., 4400 W. National Ave., Milwaukee 16.*

Circle 171D on Reader Service Card

# NOW! The WORLD Automatic Cellulose BANDING MACHINE





**How it works**— The cellulose banding material, in roll form is fed into position over the container, then cut to precise length. The container is indexed by starwheel feed. The band is opened by combined mechanical and vacuum action and transferred from a plunger over the bottle neck and cap. Operation is fully automatic. Quick changeover to other sizes of bands and bottles is readily effected.

**What it does**— J. C. Miller, Plant Manager of Miracle Power Division, The AP Parts Corporation writes: *"In the first eight months of operation our World Automatic Cellulose Banding Machine applied bands to 940,488 eight ounce Boston round bottles with 25mm caps, at a speed of 65 per minute.*

*"Before placing this machine in operation we had four to five people installing the bands by hand. High cost and fluctuating production made this operation so unsuccessful we were seriously considering changing to some other type of seal. Now, with this banding machine, our cost has been greatly reduced and we are very well satisfied with the performance and accuracy of the machine."*

**for high production,** uniform quality, low cost application of cellulose bands to glass containers of the shapes and sizes normally handled by automatic cappers, fillers and World Labelers.

One more slow, costly, laborious hand operation is now eliminated. Banding is done at packaging line speeds. World Banders are available for 75, 150 or 225 containers per minute.

For complete information on automatic application of plain bands of whatever diameter, printed bands and precisely spotted bands, get in touch with

## ECONOMIC MACHINERY COMPANY

**54 FREMONT STREET • WORCESTER 3, MASSACHUSETTS**

**DIVISION OF GEO. J. MEYER MANUFACTURING COMPANY • CUDAHY, WISCONSIN, U. S. A.**

**WORLD'S**

## Light, Transparent Tarpaulins Up Sanitation

Improved sanitation at reduced cost is claimed with use of lightweight, transparent tarpaulins.

Named C-Line, tarpaulins are termed tough, acid resistant, unaffected by grease, oil and temperature changes. They can be used to cover standby-machines, protect machinery and equipment during maintenance, cleaning, overnight or weekend shutdowns, thereby minimizing cleaning operations. They are also waterproof and require no drying before storing.

This feature, combined with ease of handling, permits wash down of walls and ceilings in plants where such sanitary measures have, heretofore, been prohibitive.

Sheeting is stated not to absorb or give off odors and can be used to cover raw materials, those in process and finished food products without affecting their taste or smell. It can be tied tightly over containers to exclude air and preserve freshness.

Dust, dirt and soil are easily wiped off with a damp cloth and grease and shortening can be washed off with soap and water or suitable solvent. Transparency permits easy inspection and identification of items covered. Tarps can be folded into small, compact packages for easy storage when not in use.—*Plastics Div., Canton Containers, Inc., 1101 Ninth St., S.E., Canton 2, Ohio.*

Circle 173A on Reader Service Card

## Maintenance Simplified on Walkie Type Truck

Easier maintenance is claimed for this new "walkie" type, battery-powered industrial truck. Redesign of power unit does the trick.

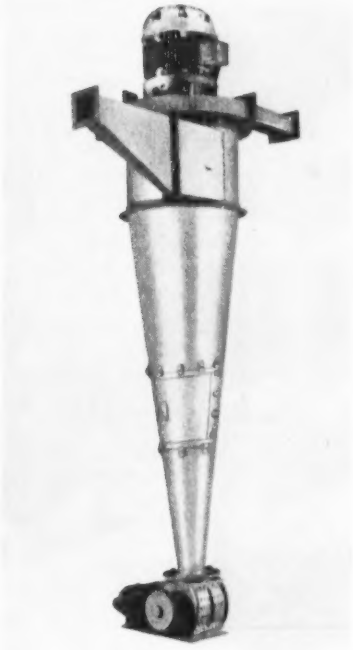
Unit cover can be taken off by removing four bolts, exposing complete unit. New cover protects drive from foreign matter, dust and dirt. Removal of four power unit mounting bolts, makes unit interchangeable.

Unit includes a new time delay slow-speed switch that eliminates possibility of operator starting truck in high speed. Electric battery cables and connector have been lowered and repositioned to better protect them.

New design will be carried out in maker's complete "walkie" line. Actual mechanical operation, now in use on present models, has not been changed. Drive unit, hydraulic unit and roller grip controls remain same on all trucks.—*Moto-Truc Co., 1995 E. 59th St., Cleveland 3.*

Circle 173B on Reader Service Card

## Sanitary Pneumatic Mover For Dry Bulk Materials



Efficient, sanitary handling of bulk materials is claimed for this improved pneumatic conveying unit.

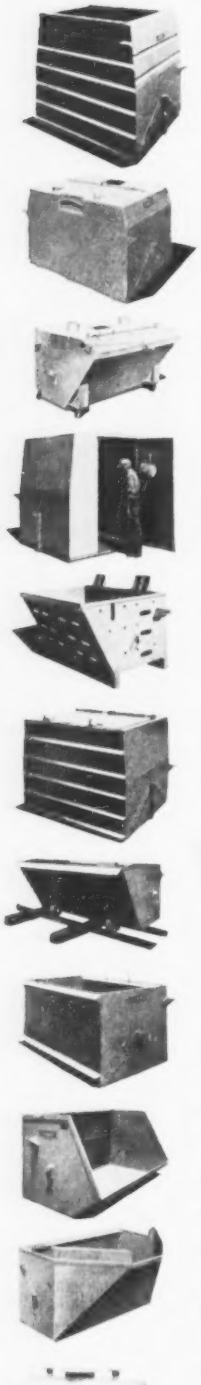
Called the Pneu-Vac, it is a negative pressure, or draw-through, system, in which fan is located on opposite side of collector from the material conveying line.

A high-efficiency fan mounted directly on top of a long-cone collector and a rotary-vane feeder-valve at base of collector are combined into a highly compact unit. Each unit is individually engineered to suit application and installation. Maker also supplies proper piping and other auxiliary equipment.

System is highly flexible since physical obstacles to conveying are nonexistent beyond space required for pipe of proper diameter. Material being conveyed does not pass through fan.

Self-cleaning system is especially applicable where sanitation and avoidance of intercontamination of products are essential. When equipped with an auxiliary multi-tube filter, it will collect all visual dust, eliminating customary losses on even extremely fine materials, according to manufacturer.

Since product conveying lines are under negative pressure and are sealed, exterior dusting and corresponding loss of product is eliminated. Material,

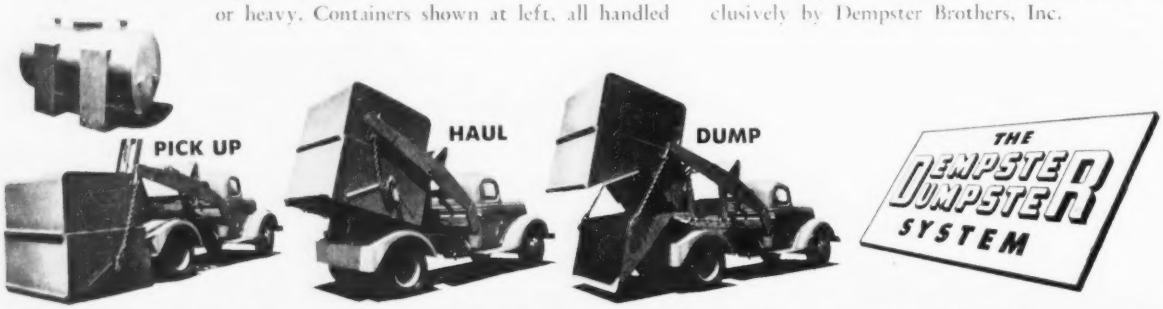


# You will Dump High Costs, too..

## . . . when you install the Dempster-Dumpster System of Bulk Materials Handling

Manufacturers over the nation have learned to eliminate the costly and inefficient method of handling bulk materials with conventional dump trucks, drivers and loading crews. You can equip one truck with a hydraulically operated Dempster-Dumpster. Then, inside or outside buildings at convenient accumulation points, you simply place detachable Dempster-Dumpster Containers, in capacities up to 4 times that of conventional dump truck bodies, with each designed to suit the materials to be handled—be they solids, liquids or dust . . . hot or cold . . . bulky, light or heavy. Containers shown at left, all handled by one Dempster-Dumpster, are only a few of the many available or that can be built to meet your needs. The Dempster-Dumpster, operated by only one man, the driver, serves scores of containers . . . one after another, as shown below.

You eliminate trucks standing idle. You eliminate re-handling of materials. You eliminate loading crews. You increase efficiency, sanitation and good plantkeeping with this Dempster-Dumpster System—the lowest cost method of bulk materials handling ever devised. Write to us for complete information. Manufactured exclusively by Dempster Brothers, Inc.




**DEMPSTER BROTHERS, 793 Shea Building, Knoxville 17, Tennessee**

suspended in a high velocity air stream, is completely aerated, thus suitably conditioning it for additional cooling, drying or heating when required.

Built in twelve standard sizes with fan motors from 2 to 60 hp. the units can handle many varied granular products with capacities of up to 50 tons an hr. and more in multiple systems, and with runs of 300 ft. of pipe and over.—*Sprout, Waldron & Co., Inc., 35 Logan St., Muncy, Pa.*

Circle 173C on Reader Service Card

## New Chemicals

### Water Treatment Products Aid Cooling Equipment

Three new water treatment products are reported to help maintain the efficiency of water cooling equipment in air conditioning systems. The three are named Preventive, Slime-X, and Cleaner.

The first is stated to inactivate solids usually found in water and hold them in solution. This is drained off once each month and not deposited on metal surfaces of equipment or as a sludge in the sump tank. Material also contains chemicals to inhibit slime and algae growth and to prevent corrosion. It is neither acid nor alkaline and is reported harmless to wood or metals or to discolor water.

Second product is an organic chlorinated phenol which has been activated by incorporating a penetrant and an interface contacting agent. Activation of chlorinated phenols provide slime control. Slime bacteria produce a gelatinous protective coating around each cell for food storage and adverse environmental conditions. Product rapidly penetrates this gelatinous matrix and performs rapid kill and removal of such organisms.

Material is reported not to attack to metals and is non-injurious to wood. It may be used in any concentration without deleterious effects to equipment.

Third is an acid type salt designed to remove scale and other incrustants which may have accumulated on equipment through lack of proper water treatment. Cleaner was designed to minimize damage to equipment and permit safety and ease of handling. No shutdowns are necessary when using products as they work while air conditioning system is in operation.—*Garman Co., St. Louis.*

Circle 175A on Reader Service Card

### Fast-Acting Germicide Goes Easy on Metals

No corrosive action was visible either to the eye or to the camera on this aluminum sheet following overnight immersion in a 100 ppm. solution of Antibac, a new, mildly acidic, fast-acting germicide. Object of test was to illustrate safety factor given by new product.

Similar tests conducted with stainless steel, even after 168 hr. of immersion, showed no significant visual change in appearance of metal. Field tests show product as a satisfactory sanitizer on both plain and anodized aluminum. Use-solutions of germacide are mildly acidic.

Sanitizing action of use-solutions starts instantly and is reported highly effective even with 15-sec. exposure time at recommended concentrations.—*Wyandotte Chemicals Corp., Wyandotte, Mich.*

Circle 175B on Reader Service Card

### Resilient Papers Offer Product Protection

Packers of candies, cookies, biscuits and fruits can protect their products with use of a specially-constructed paper material now being manufactured in the U. S.

Called Cushion Pack, it consists of layers of embossed resilient paper covered by any type of decorative, protective paper desired, with the entire pad quilted to help secure air pockets formed into the cushioned material during lamination. Each order is custom-made to meet specifications. Pack bends easily without crushing but snaps back to its original form.—*Cushion Pack, Inc., 150 Fifth Ave., Hawthorne, N. J.*

Circle 175C on Reader Service Card

### New Ingredient Replaces Discounted Coumarin

Protovanol "C" is a new ingredient termed satisfactory for the discontinued coumarin.

Ounce for ounce, new ingredient is stated to be approximate equivalent of the former in strength. It is fully soluble in alcohol, propylene and, to an extent, even in vegetable oils.

It is reported highly versatile, readily mixed in various dry bases, and readily absorbed in cane sugar, corn sugar or starch.—*Florasynth Laboratories, Inc., New York City.*

Circle 175D on Reader Service Card

### Catalase Enzyme Has Role in Research

Numerous applications of liver catalase in development work by food researchers are foreseen because of its specific reaction with hydrogen peroxide.

Enzyme catalase, when brought into contact with dilute solutions of hydrogen peroxide, converts it rapidly into water and oxygen. This property makes it possible to stop action of hydrogen peroxide at any desired point in a processing application. For this reason, catalase is being evaluated in conjunction with hydrogen peroxide for selective control of microorganisms in dairy and other edible products.

Also indicated is use of catalase and hydrogen peroxide in fermentation processes. Since 1 lb. of powder is capable of liberating almost 5,000 cu. ft. of oxygen from dilute solutions of hydrogen peroxide, enzyme has obvious potential applications as an in situ (in place) blowing and foaming agent in aqueous systems. A convenient means of obtaining oxygen is also indicated.—*Market Development Div., Armour & Co., Chicago 9.*

Circle 175E on Reader Sevice Card

### OTHER DEPARTMENTS
#### Featured in This Issue


| | |
|---|---|
| Practical Ideas | page 5 |
| Editorials | 176 |
| New Packages & Products | 182 |
| Advances in Technology | 193 |
| Questions & Answers | 202 |
| Useful New Books | 212 |
| Keeping Up With the Field | 215 |
| Recent Inventions | 222 |
| Men & Companies | 224 |
| Just Off the Press | 228 |

# In Behalf of Progress . . .

## Problems Posed by FPC Judgment on Additive

Such new additive should not be introduced into the diet "as long as a reasonable doubt remains concerning its safety."

This is a basic point made by the Food Protection Committee of National Research Council in its judgment regarding the use of polyoxyethylene stearate as a bread softener.

And FPC therefore concludes that "the experimental studies of the biologic behavior of polyoxyethylene stearate indicate the possibility of unfavorable reactions. The possibility of these outweighs the arguments advanced to support its use."

This Committee really is something of a supreme court in an advisory sense. And its action seems almost to prevent further use of a highly regarded bread softener in the early future. There is no likelihood that under these circumstances FDA will consider reopening the bread standards hearings soon for new evidence on this subject.

This unfortunate situation will cause great regret both in the baking industry and with the makers of this chemical additive.

The Committee report apparently is not fully accepted by some very competent biochemical people. Critics raise two important questions that deserve thoughtful consideration.

Question 1 has to do with the "reasonableness" of the extreme precautions and conservatism of the Committee. It does seem as though the Committee has leaned a bit backward in the interest of safety. That question can be resolved only when research work now in progress is completed, probably within the next year.

Question 2 is one that likely will be debated from now on. It has to do with the proper method for protecting small percentages of the population against exposure to things from which they seem unusually susceptible to injury.

The Committee recognizes this problem in one of the most important paragraphs of its conclusions, which says: " . . . There is no available evidence bearing upon the susceptibility to injury of subjects at advanced age, or with preexisting pathology of the genito-urinary tract or the liver. The data, therefore, cannot be related to the possibility of injury to individuals in the older age groups or to persons with impaired renal or liver function."

In this connection there is an analogy to the common problem of caring for the small percentage of the public subject to any particular allergy. Such people are entitled to know what they are getting.

In the case of bread softeners, if an item does have potential threat for a few of the population, there is certainly need to provide equivalent protection.

There is one important difference, however. In the case of allergy, the individual knows promptly that he has a tummy ache or gets a rash. And all he needs is a label identification so that he will not inadvertantly repeat the use of an annoying item.

In the case of those having an unusual susceptibility to liver injury, for example, there is no comparable warning. Perhaps some new device can be developed to guard such persons.

No one can say just now what will be done about the "poly" bread softeners. It is to be hoped, however, that the uncertainty as to their use can be unquestionably dispelled and a taboo be made permanent or a proper permission be granted later for their use.

Much more important, however, is the need to organize matters of this kind scientifically. There must be developed a practical workable system by which essential facts are promptly found, and needless restrictions avoided. This would permit technologic progress with any chemical additive which may contribute to the palatability, the shelf-life, or the dietetic value of any important part of the day's food supply.

## Your Weigh-Ticket From the Scales of Progress

You are due for some surprises. They will be contained in your next copy of FOOD ENGINEERING—the 25th Anniversary Issue, covering progress in food manufacturing from '28 to '78.

But even more revealing will be a section on the economics of progress in the industry. This ties in with the unit-operations articles to paint the overall picture of where the industry is heading, and how fast it is moving.

The issue also will evaluate important experimental developments whose impact will be felt in the future.

It is no overstatement to say that the future of your plant, and even of your job, is being weighed on the scales of progress.

The October issue of FE will constitute your weigh ticket. It will tell you where you stand and what you must do to stay in the swim.

This will be the most significant issue we ever have published.

It is designed to perform an important service to the food manufacturing industry and everyone in it or in an allied field.

Its preparation has been a tremendous task. But we are happy that we undertook it. We think you will be, too.

## Curbing Insects

—Continued from page 59

drawing up insecticides, then you would be adding air to the interior of the equipment, which would increase the pressure therein and enlarge the leaks in the equipment, carrying out most of the insecticide. If you use a sprayer that does not do this, but merely sprays with liquid, such would not happen.

However, fundamentally, a slow dripping process has, in practice, been found to be the most efficient and the one least likely to cause trouble. Actually, if enough pieces of equipment, such as drip cups, are utilized, they work much faster in a practical sense than does a single sprayer.

*The above article was based on a paper presented at the Fifth Plant Operations Forum held for plant managers of clients of the Glenn G. Hoskins Co., Libertyville, Ill., industrial consulting organization for macaroni manufacturers.*

*End* (Resume reading on page 60)

## Faster Brine Making

—Continued from page 57

The new installation comprises the Lixate process for making brine and three specially designed lightweight, corrosion-resistant tanks for holding the saturated brine and diluting it with water and a small amount of lactic acid.

Preparation of a saturated brine solution by the Lixate process—a development of International Salt Co., Scranton, Pa.—involves dissolving of rock salt without agitation followed by self-filtration.

Salt is gravity-fed from a 1,500-lb.-capacity supply hopper directly above the Lixator. Water then enters through a spray nozzle at the top of the unit and percolates through the salt. The lower portion of the salt bed is not dissolved, but remains as a filter through which the saturated brine flows through a coned channel at the bottom of the unit on its way to the collecting chamber.

Water-inflow is controlled by a float valve and brine-outflow by an orifice plate.

Saturated brine (100 deg. sal.) flows into a 120-gal. holding tank, from which it is syphoned alternately into two 535-gal. mixing tanks, to be diluted to 28 deg. sal. Mixing tanks are equipped with stainless steel propeller-type agitators.

Significant is the construction of the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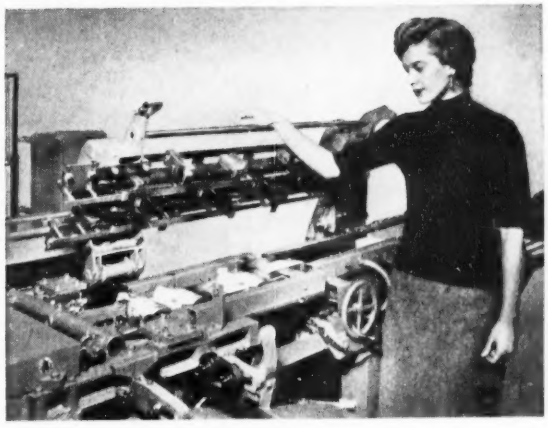

places the FF-H Frozen Food Wrapper far ahead!

**But it has a lot more that contributes to better, more efficient wrapping**

The counterbalanced, lift-up transport assembly of the new high-speed Model FF-H wrapping machine is one of the most outstanding improvements made in frozen-food wrappers.

It can be easily raised to expose the entire top level of the machine. Operator no longer has to set by "feel", but can see all parts for easy adjustment and cleaning.

There's a lot of time saved by this feature. But, in addition, quick hand-wheel adjustments have been provided for the elevator well, heater unit, belt discharge, etc. Paper-roll-feed assembly can be removed in about five minutes. Continuous-running elevator makes machine self-clearing. Specially designed clutch protects entire machine in case of overload. Automatic feeder eliminates attendant.

Runs with remarkable smoothness at a speed of 160 packages a minute.

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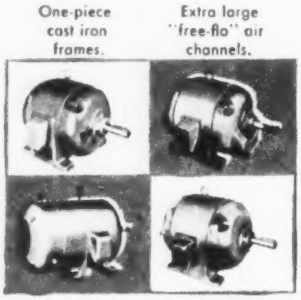
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brine-holding and mixing tanks. Specially constructed of Fiberglas impregnated with a polyester resin, the tanks are notably corrosion-resistant. Walls are only ¼-in. thick, with horizontal steel rods and vertical hardwood ribs molded into the tank for reinforcement. Tanks are fabricated by Lamminex Corp., Fall River, Mass.

The tanks are sanitary since they are smooth-surfaced and have rounded corners. They only require cleaning once a week. In contrast, the casks formerly employed had to be cleaned every time a batch of brine had been used up.

Fittings and discharge pipes from these lightweight tanks are of saran construction. Use of these tanks for other corrosive materials is foreseen.

### Speedy Packing Line

Efficiencies achieved in the preparation of brine by the new system justified the installation of a faster packing line—one that requires only 5 workers to turn out 60 jars a min.

Operations on the new line proceed in this manner:

Empty jars are hand-dumped onto an unscrambling table. From here, they are conveyed to a specially designed, adjustable trough-type packing table, where three girls need only "plow" the olives into the jars. Next the jars continue to an automatic unit that fills them up with water from sprays and inverts them four separate times.

Completely rinsed, the jars of olives then go to a 12-head rotary briner. Capping and labeling follow.

*End (Resume reading on page 58)*

### New Bacteria Spotter

—*Continued from page 47*

tensively for detection of coliform organisms in water supplies.

Preliminary studies at National Dairy Laboratories were concerned with the recovery of *Escherichia coli* from artificially infected water supplies. Low concentrations of these organisms were added to sterile water and the water passed through the millipore filter apparatus. Control counts were made by standard plating procedures. In these studies, higher counts were obtained with the filter than with standard procedures. In every case the effluent from the filter was sterile (nonsterile effluents are usually due to improper seating of the membrane mount). Results obtained in this study are given in Table I.

Further investigations were conducted on the public water available

at the Laboratories. Routine plate counts on this water indicated the presence of about 1 bacterium per ml. Tests with the millipore filter also showed low numbers of organisms.

### Application of Technique

These preliminary studies indicated that the membrane filter was a reliable method for concentrating and enumerating bacteria in water samples. Therefore, studies were initiated to investigate applications of the filter technique to the dairy field.

Here, research investigators and regulatory health officials have long been interested in better methods for evaluating sanitary conditions of pipelines. Careful visual inspection was possible as long as lines were disassembled for cleaning. But during recent years the trend has been toward in-place cleaning, which has resulted in obvious difficulties in evaluating the sanitary condition of lines.

Investigators at the Laboratories felt that the new technique showed promise for this evaluation. It was reasoned that, if a pipeline were properly cleaned and sanitized, few, if any, bacteria would be present on the surfaces of the line. In addition, the large volumes of water necessary to rinse these lines would further dilute the numbers or organisms recovered. Hence, a standard plating procedure might not show the presence of any bacteria in the rinse water, when actually there might be organisms present in concentrations less than 1 per ml. Therefore, ability of the new technique to concentrate bacteria in large volumes of water might provide a suitable test procedure.

Pilot-plant runs indicated that this assumption was correct. Then studies were made in a dairy employing in-place cleaning. The usual swab technique was used for comparative purposes.

In this particular plant, hot water sanitization followed cleaning. Samples of this water were taken from the

**TABLE I—MILLIPORE FILTER COUNTS** of *E. coli* in Artificially Infected Waters Run Slightly Higher Than Standard Plate Counts

| Dilution of Culture Added | Plate Count (Per Ml.) | Millipore Filter Count (Per Ml.) | Effluent From Filter |
|---|---|---|---|
| $10^{-8}$ | 32 | 47 | Sterile |
| | 28 | 53 | Sterile |
| | 21 | 41 | Sterile |
| | 17 | 61 | Sterile |
| $10^{-9}$ | 1 | 7 | Sterile |
| | 2 | 15 | Sterile |
| | 1 | 5 | Sterile |
| | 2 | 11 | Sterile |
| $10^{-10}$ | 0 | 2 | Sterile |
| | 0 | 1 | Sterile |
| | 1 | 3 | Sterile |
| | 0 | 1 | Sterile |

**TABLE II—CIP PIPELINES** Sanitized With Hot (186 deg. F.) Water Show Positive Bacterial Counts by Millipore and Swab Methods

| Millipore Filter Count (Per 500 Ml.) | Plate Count (Per Ml.) | Swab Count (Per 8 Sq. In.) |
|---|---|---|
| 13 | 0 | 46 |
| 12 | 0 | 18 |
| 4 | 0 | 6 |
| 4 | 0 | 0 |

**TABLE III—BACTERIA COUNTS** are reduced by flushing CIP Pipelines With Well Water After Sanitizing With 200 ppm. Chlorine

| Sample | Time (Min.) | Volume (Ml.) | Millipore Filter Count |
|---|---|---|---|
| Well Water | .... | 250 | 18 |
| Well Water | .... | 250 | 15 |
| Rinse | 0 | 250 | 281 |
| | | 250 | 301 |
| Rinse | 3 | 200 | 182 |
| | | 200 | 300 |
| Rinse | 5 | 150 | 346 |
| | | 250 | 384 |
| Rinse | 20 | 100 | 12 |
| | | 225 | 8 |
| Swab counts/8 sq. in. | | | |
| No. 1 | | 16 | |
| No. 2 | | 10 | |
| No. 3 | | 10 | |

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discharge valve in the line and put through the filter. Plate counts were also made on the water, and several joints were swabbed at the points where the line was disassembled. Typical results are shown in Table II.

Additional checks were undertaken using a 200-ppm. chlorine solution to sanitize the lines. Following this step, well water was circulated and collected at various time intervals. Samples of this rinse water were passed through the millipore filter, as was also a portion of the well water. From results summarized in Table III it can be seen that after a 20-min. flushing period the majority of the organisms were removed.

The question was raised as to chances of recontamination of cleaned and sanitized lines by flushing with well water. To eliminate this possibility, the sanitizing solution was collected in sterile containers to which had been added sufficient sodium thiosulfate to neutralize the chlorine.

Preliminary tests indicate that this last modification can be applied satisfactorily. Additional studies are being carried out to determine the practicability of such a testing procedure.


### Acknowledgment

The author wishes to thank Mr. Harvey Fram and Dr. Franklin W. Barber for their advice and assistance in research and preparation of the report on the method, "*Application and Evaluation of the Millipore Filter Technique in Food Bacteriology.*" *Presented before the New York Section, Institute of Food Technologists,* this report was the basis for the above article.


*End* (*Resume reading on page 48*)

## Slashes Freezing Costs

—*Continued from page 51*

operator actuates a motor-driven ram that moves the cartons into the freezer.

As each lot of 12 packages is shoved between the freezer plates, 12 frozen cartons are delivered from the discharge side of the unit. These drop onto a conveyor and are carried to the casing station in a non-refrigerated storage room.

Larger units are comprised of 16 or more contact plates, each accomodating 144 packages (10 oz.). Each 48x66-in. plate contains 70 ft. of ¾-in. square steel tubing between two sheets of galvanized steel. Ammonia is fed to the plates through a ¾-in. hose. Stainless steel nipples connect the hose to the plates, eliminat-

ing the possibility of breakage at the required temperature of −30 deg F. Plates are slanted in order to allow the ammonia to drain off quickly by a hose leading to an accumulator.

The tiers of plate freezers are fixed in a cage, which is automatically elevated or lowered by a 1-hp. gearhead motor equipped with an electric brake. At the beginning of the freezing cycle, when the tiers of plate-freezers are empty, the automatic loader starts with the top plate and fills each tier as it is elevated.

### To Zero in 75 Min.

When the product is frozen, the cage is automatically lowered and the continuous feed and discharge begins. Time of the freezing cycle varies with the thickness of the package. A $1\frac{3}{8}$-in. package freezes to zero or lower in 75 min.

An electric eye automatically positions each tier at the loading and unloading apertures by actuating the brake on the elevator motor. A second electric eye actuates the motor and mechanism for separation of the two plates so that packages may be loaded by the ram and frozen packages will slide out of the exit. This second eye also closes the plates so they compress the packages by 1/64 in. When one freezing tier is filled, the photoelectric cell releases the brake, actuates the motor, and the cage is elevated to the next freezer-plate. When the unit is entirely charged, an automatic relay switch returns the cage to its starting position and the cycle is repeated.

Units are defrosted only at the end of each season's run. This eliminates the several hours' time conventionally required daily for defrosting the truck-and-tunnel type unit or the manually-operated plate freezer.

### One-Man Operation

Only one pushbutton is needed to set each unit in operation. According to the manufacturer, a battery of three units with an input of 100 cartons per minute can be operated by one man. In contrast, six to eight men are required to operate a truck-and-tunnel or manually-loaded plate freezer setup with similar capacity.

As compared to a truck-and-tunnel operation, additional savings accrue by abolishing trucks, trays, and the labor needed to load trays and move trucks into tunnels. By elimination of refrigeration fans and pumps, a savings of 75-100 hp. in refrigeration power loss for a 2-ton per hour operation is effected. Temperature rise occasioned by opening doors to charge tunnels is eliminated also.

*End (Resume reading on page 52)*


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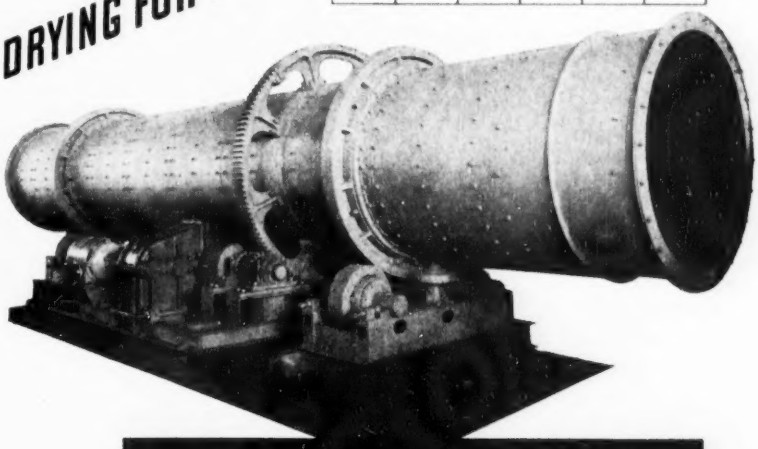

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Addition of the Standard-Hersey *pre-heater*, shown above, rounded out the team. It works like a double header locomotive in sharing the dryer load and thereby cutting drying stage time. Urgent production schedules are being met at much lower cost than the outlay for a second complete 3-unit plant.

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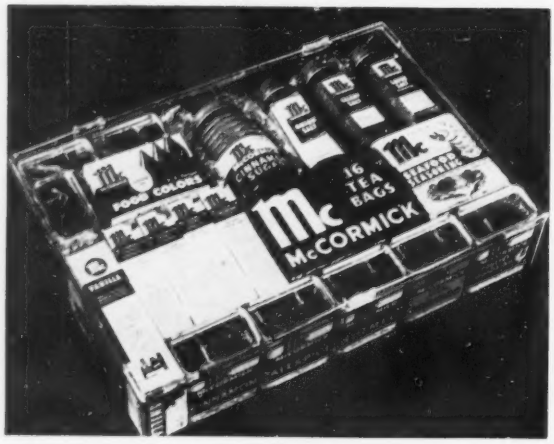
# NEW PACKAGES & PRODUCTS



## Gift Packages Promote Good-Will

Holidays and special occasions find more and more firms using the gift package idea to create good-will and build up public awareness of their products. The favorable reaction to this type of promotion has prompted many companies, particularly those in the food field, to give this serious consideration. To successfully use this idea, products must be presented in a unique and eye-appealing manner. Consequently, containers and methods of packaging are of primary importance.

The gift packages of McCormick & Co., Inc., Baltimore, Md., are outstanding examples of this. A variety of three gift boxes is now being offered. Used primarily for gifts during the holidays, they are also distributed for special purposes throughout the year. It is estimated that on an annual basis, approximately 1,500 are dispensed. Developed and designed principally for the company's own use, outside firms can make arrangements for their purchase.

Each container holds from 15 to 20 well-known McCormick spices and extracts in standard pantry-size metal and glass containers. Variety offered can be seen in the photographs above.

The latest package introduced is the 9¼x13¾x2¼ in. rigid polystrene plastic container (Tri-State Molding Co., Inc., Henderson, Ky.). This container, with its hinged lid, has many re-use possibilities.

The simulated treasure chest, measuring 11x8x6 in. (S. K. Smith Co., Chicago) is an excellent example of design which brings people to associate it with the product. Chest in its antique finish is reminiscent of the old swashbuckling sailing days when wars were won and lost over the precious commodity—spices.

Third item, popular with would be "men in the kitchen" as well as the housewife, is the three-shelf cherry wood spice rack, measuring 10¼x15½x3¾ in. This is a favorite with gourmets who like their spices and flavorings at hands reach.

For Package Data Use Reader Service, p. 157.

DISPLAY IMPACT and eye appeal are strengthened in the redesigned "Beechies" gum packs (bottom photo), product of Beech-Nut Packing Co., Canajoharie, N. Y.

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## Companies Add New Products to Present Lines

**H. J. HEINZ CO.**, Pittsburgh, Pa.: Three ready-to-serve items packed in 8½-oz. cans—chicken noodle dinner, chop suey, and beef goulash. Also, a new baby food—strained cream of tuna, in 5-oz. glass jars.

**BLUE STAR FOODS INC.**, Council Bluffs, Iowa: Ready-to-heat and-serve chicken pie, packaged in 8-oz. individual foil containers.

**PASCO PACKING CO.**, Dade City, Fla.: Complementing its "Old South" brand of fruit juices—a 10-oz. can of quick frozen grapefruit sections.

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chocolate flavored coating
CHERRY ICE CREAM
Bon Bons
INGREDIENTS: Coating contains Sweet Chocolate with Vegetable Oils added. Artificial flavor and color added to Cherry Ice Cream.

**THE BORDEN CO., PIONEER DIV.**, Brooklyn, N. Y.: Cherry ice cream bon bons (under license arrangement with De Cicco's Bon Bon Corp., Los Angeles. Package features illustrations of bon bons with cutaway view.

**SEABROOK FARMS CO.**, Bridgeton, N. J.: A 10-oz. carton of chopped quick-frozen broccoli cut in ½ in. sections. Wrapper features colorful photo of broccoli.

## Cake Mix in Pouches

Packaged for ease in preparation is a new angel food cake mix now being marketed by Russell-Miller Milling Co., Minneapolis, Minn.

To provide best possible protection and preserve keeping qualities of the ingredients, especially the powdered egg white, considerable research was carried out in order to find a suitable container.

The problem was solved by using laminated packaging materials furnished by Shellmar Betner Div., Continental Can Co., Inc., Mount Vernon, Ohio. Powdered egg whites are heat-sealed in a laminated pouch of reverse-printed glassine, aluminum foil and polyethylene. This is prominently identified with the letter E to indicate the egg mix. Cake flour mix is packaged in a heat-sealed laminated bag composed of printed paper and polyethylene and clearly identified with the letter F.

Both pouches are packaged in a colorful carton on which is photographically reproduced the finished product.

## Beer-Like Beverage

Looking and tasting like an extra dry and light beer (but with an added "kick"—so say the beer connoisseurs) is a malt liquor introduced by M. L. Goetz Brewing Co., St. Louis, Mo.

Product is being marketed in 8-oz. cans under the "Country Club" label. Cans are packaged in cartons.

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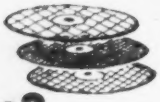

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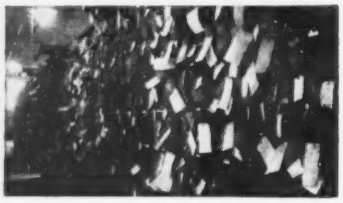

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## Bag for Peeled Potatoes

Colony Food Products, Inc., Medford, Mass., has developed a special per bag to give additional protection during storage and shipment of its "Sta-Wite" brand of peeled, ready-to-cook potatoes.

The 30-lb. bag, manufactured by Equitable Paper Bag Co., Inc., Long Island City, N. Y., has an inner wall of polyethylene-laminated kraft paper which protects contents from contaminating odors. It also acts as a shield against rapid temperature changes and slows evaporation. Outer wall consists of a rugged wet strength kraft paper.

For Package Data Use Reader Service, p. 157

## Powdered Cream in Packets

Success of its powdered instant coffee cream called "Pream", introduced last year (FE, Oct. '52, p. 160), has caused M & R Dietetic Laboratories, Inc., Columbus, Ohio, to put this product on the market in individual serving units, as well as in the 4-oz. cans.

The new unit package is a lamination of sparkling reverse-printed acetate, foil and Pliofilm, supplied by Shellmar Betner Division of Continental Can Co., Inc., Mount Vernon, Ohio.

The product, a 100 percent pasteurized and homogenized dairy product, is made from fresh cream, lactose, and non-fat milk solids. It requires no refrigeration. To use with coffee or tea it is necessary only to sprinkle desired amount into the beverage, stir and drink.

The non-waste, non-spoilage, space-saving, and sanitary features of these portion-control packs should be of considerable interest to airlines, railroads, and a great many other commercial users.

## Mashed 'Tatoes in 1-Min.

R. T. French Co., Rochester, N. Y., is marketing an 8-oz. carton of precooked and dried potatoes that can be reconstituted into mashed potatoes within a minute.

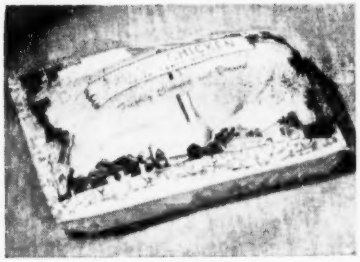
Selected white potatoes are peeled, cooked, mashed, and converted into non-lumping powder. Preparation consists merely of pouring milk into boiling salted water. Then, while stirring, the instant potato mix is added, beaten until white and fluffy.

Powder is packed in a heat-sealed glassine envelope and then placed in an attractively designed chipboard box.

## Vented Wrap for Poultry

A ventilated cellophane overwrap for use in prepacking poultry is being used by Massapequa Farms, Long Island, N. Y., with considerable success.

Called "Respiro-Pak", this type of overwrap consists of a pattern of tiny "casement window" vents. This enables gases inside to escape but prevents dust and other extraneous matter



to enter. It also prevents trapping of disagreeable odors in the package, eliminates fogging of film, and is said to preserve natural color of poultry and afford longer shelf life. With this type of wrap, it is not necessary to caution user to remove wrap from chicken before placing it in refrigerator.

New wrap is printed in a colorful 4-color design and processed by Cello-Masters, Inc., New York City.

For Package Data Use Reader Service, p. 157.

## Re-Use Jar for Olives

"Milrose" brand Spanish olives, a product of Kay Packing Co., Baltimore, Md., are now being packed in re-usable refrigerator jars. (Knox Glass Bottle Co., Jackson, Miss.). To allow for maximum visibility, identification and other information is attractively lithographed on rubber ringlined screw cap closure. (Crown Cork & Seal Co., Baltimore, Md.)

For Package Data Use Reader Service, p. 157

## Package & Product Shorts

### Canned Soft Drinks on Northwest Coast

Canned soft drinks, in four flavors, are now being distributed in the Pacific northwest states by Can-a-Pop Beverage Co., Div. of Sheridan Brewing Co., Sheridan, Wyo.

### Two New Quick Frozen Specialty Items

Packaged in oven-ready aluminum pans a quick frozen lobster and a shrimp ala Newburgh pie are being marketed by Dorset Foods Ltd., Long Island City, N. Y.

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## Plant Colors Pay

—*Continued from page 46*

shades have tended not only to make certain plants distinctive, but also to create a better spirit in the workers themselves, since humans are color conscious.

A further means of improving employee morale is found in choosing proper colors for plant cafeterias and rest rooms for the employees. Surely, a company cafeteria in any food plant should be a model of efficiency. With food as a product, the surroundings in which foods are served must be appetizing and inviting.

It is a curious psychological fact that certain colors appeal to the appetite, while others have exactly the opposite effect. Poorly chosen wall colors in eating places naturally ruin one's appetite, while proper ones tend to increase it. A particular study revealed that the wrong use of color in a railroad dining car resulted in a reduction in the size of meals the passengers ordered, with a consequent loss of income. A redesigned color scheme quickly changed this situation. Naturally, not only the wall colors of a dining area are important, but also appetizing color should make itself effective in the tables, the napery, and even the dishes upon which the food is served.

As for color in rest rooms, while the use of white indicates a high regard for sanitation, equal or better effects can be secured through use of colors that appeal more strongly to men and women. Varying shades of blue are often suggested for men's rooms, while slightly gayer tones (such as rose) are more appreciated by the ladies.

## Public Relations Important

Management in the food field is keenly aware of the importance of good community relations. It places a high value on the good impressions created in the public mind by both its product and its plant. Plant visits may be strongly encouraged by management. Not only the families of employees but the public in general may be welcomed. Many plants conduct guided tours—invite groups from schools and colleges, entertain convention delegates, and otherwise hold "open house" for visitors as a means of promoting goodwill for both plant and product. Tourists carry home with them a special fondness for a product they have seen being manufactured or processed. Thus made brand conscious, they recommend the product to friends and neighbors.

This demands a colorful plant,

streamlined for efficient operation and properly engineered, functional use of color, in order to leave the right sort of an impression with visitors.

The same principle applies to many factors in operation. Take the trucks in which the product goes to market. Through astute use of color, they become traveling goodwill ambassadors, carrying a quality atmosphere that is the best possible advertisement. A fleet of such transport equipment widely spreads its message, and so is of high value to the company.

Incidentally, the correct use of color on such out-of-plant facilities also promotes better maintenance. Drivers take pride in their equipment and appreciate the importance of keeping it looking its best. Soil and grime must be instantly removed, for any carrier of food must be clean.

### Reduces Accidents

Color finds one of its most effective uses in reduction of costly lost-time accidents. Management is well aware of the high accident-frequency in the food field as compared with some other lines of business. And the latest available figures of the National Safety Council (covering 1951) remain disappointing. They disclose that injury rates jumped 10 percent in frequency and 15 percent in severity. The average for all industries combined revealed a 5 percent decrease in frequency and a 3 percent decrease in severity. In food, the severity rate of 1.00, as compared with .97 for all industry, was only slightly higher. But the frequency rate of 14.21 for food, as against only 9.06 for all industries, is considerably higher.

Strange to say, large plants in the food industry accounted for the sharp rise in the rate increases, while the middle-sized and small plants showed only moderate frequency-rate rises and registered a decrease in severity rates.

Industry in general has improved its rates since the basic period of 1935-1939 to a greater extent than has the food field, where the accident-prevention problem thus remains of major concern.

### Case Histories Cited

To cut accident frequency is a constant problem. Accidents represent definite costs in compensation payments, lost production, medical care, etc. Here, creation of a tested and proved color code provides a positive remedy for such losses. And the development of such a code for safety purposes is both economical and simple. Case histories demonstrate high effectiveness. For example, the


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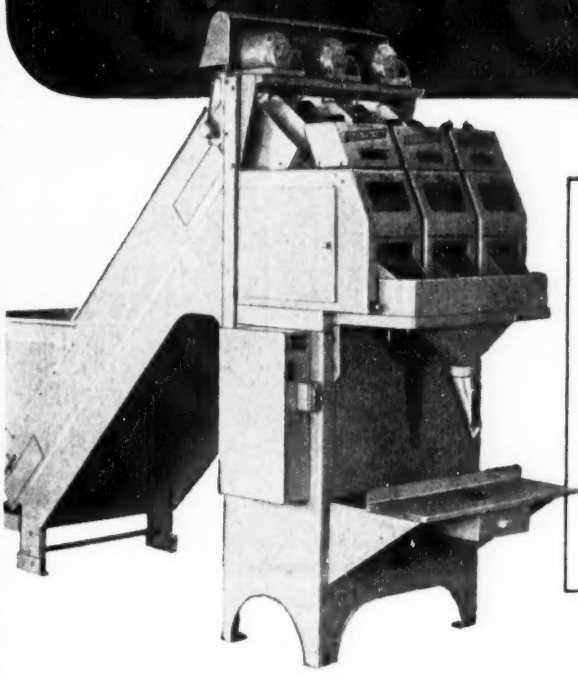

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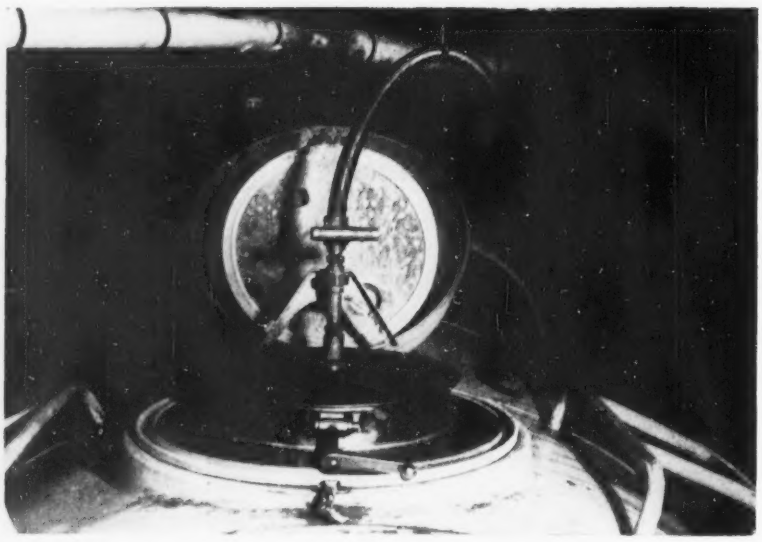

# How NEW Rotary Sprayer Cleans Tank Car Interiors in 1/10 Former Time

**User of mechanical spray cleanser also saves on materials and hot water—he reports better results, too.**

Cleaning the insides of a large over-the-road tank truck was extra tough at this well known edible oil refinery, because 1500 gallon tank compartments held tenacious heavy-bodied cote oil, and also a mixed vegetable-fish oil. They had to be filled with water, charged with caustic, and boiled for 6 to 8 hours before dumping and rinsing. This cleaning method was time-consuming, hazardous, and not always too effective. Could Oakite help them?

The Oakite Technical Service Representative arranged a demonstration of the Oakite Rotary Sprayer. The unit was set into the tank opening and a 200°F solution of Oakite Composition No. 24 was sprayed at 90 lbs. pressure for 20 minutes. This was followed by a 180°F spray rinse. Then a five minute cold water hose rinse.

Results: Tank completely clean with a 6½ hour saving on time. Tremendous quantities of hot water also saved —plus a $15 saving on material for this one job alone.

Proving that ... in industrial cleaning it always pays to consult Oakite.

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Oakite offers over 80 specialized cleaning materials, up-to-the-minute methods and equipment, plus long experience—all of which make short work of sanitation in food plants. More information in this booklet. Write Oakite Products, Inc., 26G Rector Street, New York 6, N. Y.

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Navy has reduced its accident frequency 28 percent since 1948—with a well coordinated safety color code.

In another instance, the New York Transit System, with its 38,000 employees, reduced accident frequencies 42.3 percent within a period of 18 months through a carefully supervised and installed safety color system. Compensation insurance statistics indicate this is equivalent to a saving of $500,000 per annum.

Marshall Field & Co., one of the first to install an anti-accident color code, reports a decrease in lost-time accidents in its North Carolina textile plants from 6.44 to 1.43. Many other cases might be cited. While color is admittedly not the only factor here, its role is a dominant one.

## How Code Works

Back in 1943, the writer designed a code that has since been accepted in substantial part by American Standards Assn. Today, it is being broadly applied by both private industry and the Government. Briefly described, it is as follows:

Yellow, or a combination of yellow and black, is used to mark the strike-against, stumbling, and falling hazards found in obstructions, low beams, pit and platform edges, dead ends, and the like. In checkerboard form, the same yellow and black warn against eye hazards encountered in welding. Orange is used for acute hazards that are likely to cut, crush, burn, or shock a worker. It is painted along cutting edges, near rollers, gears, exposed electrical hazards, and hot piping.

Green is used to identify first aid equipment, and red for fire protection devices. Blue is employed for controls in general, for switch boxes, and to mark equipment shut down for repair, such as ovens, elevators, machinery, scaffolding.

Recently, a purple and yellow symbol has been introduced by the Atomic Energy Commission to mark radioactive hazards and radiochemicals.

## Cuts Accidents

One canning plant has prevented many accidents through use of caution color stripes on the platform, bumper, and other parts of its hydraulic lift trucks. Because they are close to the floor, low parts of such equipment are frequently overlooked by workers and have been the cause of many tripping and falling accidents. A confectionery plant also applies color to lift truck handles, to serve as a warning to those who might bump into the shaft in its vertical position or trip over it in the horizontal position.

Additional savings are effected through the improved housekeeping that results from proper use of color. Workers take pride in clean surroundings. The hues automatically suggest better attention to plant equipment, greater care of individual machines, less spillage, tidier floors, and a thorough cleaning of hard-to-get-at corners by porters and maintenance men. Lax cleaning is discouraged when color is quick to reveal neglected areas.

### Simplifies Inventories

Paint inventories are apt to be sharply reduced through the introduction of a scientific color code. Since requests for purchase of paint come, in the average plant, from multiple sources and often are handled with little regard for standardization, huge waste can easily result. Checking of one large food plant revealed the purchase of more than a hundred different colors of paint—all ordered on specifications from different department heads. Subsequent adoption of a color scheme for the entire plant met all needs in a scientific manner and cut the paint required to around 25 colors. This resulted in large savings made possible by price advantages on quantity purchases, lower inventory investment, a minimum of waste due to deterioration, and lowered labor costs are effected in stocking, handling, and application.

### Fix Responsibility

Since color is a matter of concern to all departments, action by the various department heads without regard to an overall plan could easily lead to chaos. Use of color at cross purposes can always be averted by stressing that close supervision of the program should be centralized in top management. Responsibility should be fixed. Without ignoring the requests of individual departments—such as maintenance men, safety supervisors, foremen—skillful management can inaugurate a unified program to meet all requirements.

Such a program, guided by the recommendations of a qualified color consultant, inevitably leads to better working conditions, increased production, improved employee morale, a reduction in accident frequency, and the general promotion of efficiency.

Clearly, color has demonstrated its merit as a tool for industry. It substantially improves the working of many other factors in plant administration. In the food field, color engineering is a vital component of general plant engineering.

*End* (*Resume reading on page 47*)


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# —to promote better health

TO promote better health, mere enactment of laws is insufficient. Experience has shown that effective education of the public in nutritional matters depends to a great extent on the dissemination of the principles of nutrition, food values and related subjects. If the public is properly educated, it will naturally prefer the *improved* staple foods over those which are lacking in good nutritional value.

THE practice of enriching or fortifying foods for better health is becoming more widespread. For example, enrichment of many cereal foods, the fortification of certain fruit and vegetable juices, and of margarine, are accomplished facts in the United States. The list lengthens because food processors know that, fundamentally, the most important factor in foods is nutritive value. So they are making their good foods better—to the benefit of millions of people.

THE firm of Hoffmann-La Roche has for many years pioneered in the production of vitamins for the food and other industries throughout the world. These vitamins, synthesized by chemists, are identical with those existing naturally and are manufactured on a large scale at a much lower cost than if they were extracted from natural sources. These are the vitamins that are used for flour and bread enrichment, the process which to a great extent restores important nutritional values which are unavoidably lost in the milling and processing of wheat when fine, white flour is produced. Rice, corn and other cereal grains are similarly restored and fortified.

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# ADVANCES IN TECHNOLOGY

## Nonfat Dry Milk Solids Lack Essential Nutrients For Active Growth of Lactic Acid Cultures

A possible explanation as to why rate of growth of lactic cultures in reconstituted nonfat milk solids varies from day to day, and why they frequently show gradual loss of activity, is contained in results of a recent investigation.

Purpose of the experiments was to determine whether or not milk, as used for starter culture, provided all the nutrients required for active growth of various microorganisms.

Thirty-five strains of *S. lactis* and *S. cremoris* isolated from commercial starter cultures were grown on basal media to which were added various amino acids, vitamins, and liver fraction L.

Results showed that all strains required proline, isoleucine, valine, leucine, histidine, glutamine and methionine, and all except one required arginine. One or more strains required additional amino acids to initiate growth.

Niacin, pantothenic acid and biotin were needed by all strains tested, and pyridoxine and thiamin were necessary for maximum growth. Most strains were stimulated by riboflavin and more than ½ required it to produce satisfactory growth.

Liver fraction L provided the greatest stimulatory effect. This was especially true of cultures that were characterized as slow acid formers.

Digest from "The Nutritional Requirements of Lactic Streptococci Isolated From Starter Cultures. I Growth in a Synthetic Medium," by A. W. Anderson and P. R. Elliker, *Journal of Dairy Science*, 161-67, Feb. 1953.

### Babcock Test Techniques

Tolerances for certain practices followed in testing milk by the Babcock method have been established by a large number of experiments.

Centrifuge speeds were checked on electrically driven machines heated to 130-150 F. with a 20-in. centrifuge, assuming the AOAC value of 759 rpm. as standard and a variation of plus or minus 0.01 percent fat as acceptable, speeds from 734-799 were permissible. Speeds of 839-914 were established for 16-in. machines; 781-850 for 18-in.; 694-756 for 22-in., and 660-719 for 24-in.

Centrifuging for 2 periods of 5 and 3 min. yielded results equivalent to 3 periods of 5, 2, and 1 min.

Use of 17.5 ml. acid (1.82 sp. gr.) gave slightly lower results than 14 ml. 1.83 sp. gr. acid. However, 17.5 ml. 1.83 acid resulted in tests with columns that were burned.

If an 8-oz. bottle contains 160 ml. or less sample, adequate mixing may be obtained by shaping bottle back and forth horizontally 6 times in 2-3 sec., or by pouring back and forth 4 times.

For greatest precision, tip of pipette should be inserted to a point equal to about ½ the depth of the milk in the bottle.

Digest from "A Study of Certain Techniques Used in Testing Milk by the Babcock Test," by B. Heinemann, *Journal of Dairy Science*, 450-58, May 1953.

## BAKING

### Custard Fillings Preserved With Added Antibiotics

Studies on preservation of custard fillings with subtilin and combinations of subtilin and terramycin reveal the superiority of the latter combination over the single antibiotic for this purpose.

Preliminary sensitivity tests showed that terramycin had the widest spectrum for antibacterial action against those strains of food-poisoning micrococci, salmonelae, and enterococci that we possess.

Five strains of organism capable of producing food illness were used in the tests. Subtilin alone, in concentration of 100 ppm., preserved custard fillings against two strains of enterococci for three days; but after six days of incubation both fillings were slightly spoiled due to the growth of heat-resistant spoilage contaminants.

A concentration of 100 ppm. subtilin and 1 ppm. terramycin was bactericidal to food-poisoning strains of enterococci, although the same combination had little effect on test strains of *Salmonella*. When the terramycin content was increased to 5 and 10 ppm., growth of both *Salmonella* strains was considerably retarded.

Best preservative effect was obtained with subtilin at 100 ppm. and terramycin at 10 ppm. Use of 100 ppm. subtilin and 5 ppm. of terramycin was bactericidal to *M. aureus* organisms and after 8 days' incubation the count was negligible.

Digest from "The Complementary Action of Subtilin and Terramycin in Preserving Custard Fillings," by W. J. Godkin and W. H. Cathcart, *Food Technology*, Vol. 7, 282-85, July 1953.

### Automatic Pan Greaser

Automatic and continuous greasing of pans is the subject of a recent patent relating to baking machinery.

Greasing unit is portable and designed to be used in connection with other bread-baking equipment. It comprises a station to which pan sets are conveyed to be greased by spray guns, the latter being actuated by a pawl on the pan conveyor.

Unit is completely enclosed except for openings for reception and discharge of pan sets. Means are provided for recovery of grease and prevention of its escape into the air.

As each pan moves into the greasing position, a pawl on the conveyor is depressed, actuating electrical and pneumatic devices that cause the gun to spray a predetermined quantity of

INDEX TO ABSTRACTS


DAIRY
- Nonfat Milk Solids Lack Some Lactic Culture Nutrients ..... 193
- Babcock Test Techniques ..... 193

BAKING
- Custard Filling Preserved ..... 193
- Automatic Pan Greaser ..... 193

FISH & POULTRY
- Effective Sanitary Procedures ... 194
- Panel Scoring Proved Valid .... 194

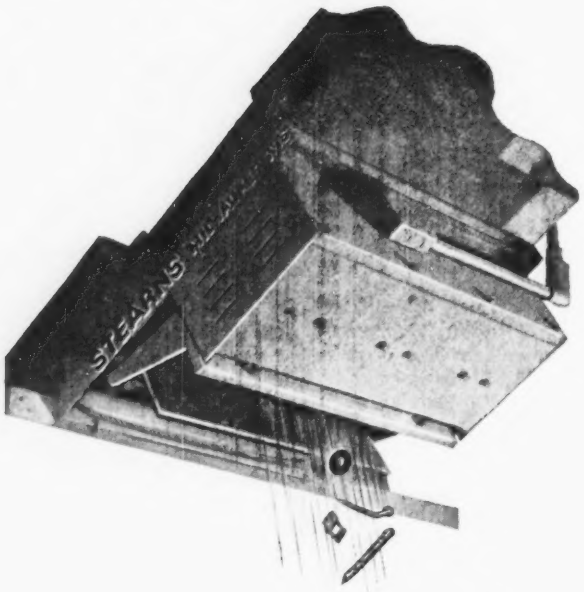
FRUITS & VEGETABLES
- Refrigeration's Role ..... 195
- New Volatile Flavor Process .... 196

CEREAL PRODUCTS
- Adding Copper to Barley Cuts Malting Losses ..... 196

BEVERAGES
- Characteristics of Beer Protein .. 197
- Coffee Substitute ..... 198

FATS & OILS
- Antioxidant Properties of Osage Oranges ..... 198

MISCELLANEOUS
- Vibrations Plus Pressure Feature New Homogenizer ... 199

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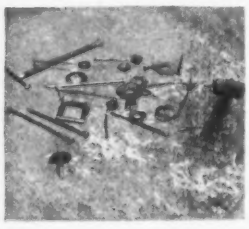

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grease on the pan. Excess spray is collected in suitable tanks beneath the conveyor, and a blower forces spray-laden air through a baffle and filter before it passes outside the unit. Pans move continuously toward the discharge end of the unit, and reach the panner in condition to receive dough.

Digest from U. S. Patent 2,633,820, issued Apr. 7, 1953, on an application dated June 1, 1950, to Ernest Kuerber, Chicago, Ill.

## FISH & POULTRY

### Effective Sanitizing Procedures Increase Poultry Shelf-Life

Unfrozen poultry which has been processed under chlorinated water conditions can be expected to have a shelf-life up to 9 days longer than that handled without chlorine.

This is the conclusion of researchers of the Poultry Branch, PMA following work done under commercial conditions in cooperating processing plants.

They found the following sanitizing methods produced visibly cleaner poultry of consistently better sanitary quality:

1. In-plant chlorination of processing water at 10-20 ppm. and use of liberal quantities of this water during all steps in the operation.
2. Use of mechanical cleaning at last operation in evisceration line, using chlorinated water to keep this equipment clean.
3. Ultra violet radiation applied just before packaging.

Two other sanitizing methods were tested and proved less effective: Chemical dipping of eviscerated birds produced an 85 percent reduction of bacteria. But faster acting germicides are necessary to make the process applicable to plant operations.

Chlorinated snow was found to lose its chlorine quickly and therefore was no more effective than snow made from plain water for chilling the poultry.

Digest from "Santitizing Poultry Processing," by E. E. Drewniak and E. R. Baush, *Marketing Activities*, (pub. by Prod. & Marketing Adm., USDA, Washington 25), 3-5, June, 1953.

### Panel Scoring Proved Valid For Evaluating Stored Fish

Evaluation of quality of fresh white fish (cod) during storage in ice for periods up to 21 days was carried out by means of a panel using scoring system developed during the studies.

Panel members without experience in judging fish, were first given a short course in the microbiological, chemical and organoleptic changes oc-

curing during spoilage, along with demonstrations of both raw and cooked fish in various stages from absolutely fresh to putridity.

Entire panel was trained by examination of 3-12 samples daily, from stocks of ice-stored fish up to 21 days old. Examination, and scores assigned to different qualities, included: General appearance of whole fish, 5 points; appearance of the flesh, particularly cut surfaces, 5 points; texture, 5 points; odor, 10 points; odor of cooked fish, 10 points; texture, 5 points; flavor, 10 points.

Scoring results indicated that the technique is valid in most respects, and that panel members were scoring a real effect. Method is especially useful for assessing various storage effects such as temperatures or methods of stowage. Scoring method is a numerical evaluation of the kinds of judgments made by consumers, and in practice samples could be differentiated for ice storage to within a day or two.

Digest from "The Development of a Numerical Scoring System for the Sensory Assessment of the Spoilage of Wet White Fish Stored in Ice," by J. M. Shewan, Ruth G. Macintosh, C. L. Tucker, and A. S. G. Ehrenberg, *Journal of the Science of Food & Agriculture*, Vol. 4, No. 6, 283-98, June 1953.

## FRUITS & VEGETABLES

### Refrigeration's Role In Prepackaging

To obtain the preservation benefits of prepackaging fresh fruits and vegetables, proper precooling, refrigeration in transit, and adequately cooled display facilities are required.

Refrigeration should begin as soon as possible after harvest, and with very perishable products, cooling to desired temperature should be done before they are shipped.

This may be accomplished by use of cold air currents in cars and trucks, stationary precooling plants, mobile precooling units, or tunnel precoolers; cold water or hydrocooling, or vacuum cooling.

Proper refrigeration in transit is also very important, especially with increased distance from markets. Most produce is shipped transcontinentally by insulated refrigerator cars equipped with fans and large ice bunkers. But truck lines are hauling an increasing amount over shorter distances.

Much of the value gained from careful handling and refrigeration can be quickly dissipated by improper care at wholesale and retail levels. Too many wholesalers set their produce out on the sidewalk where it warms up in the sun, and many retailers make little or


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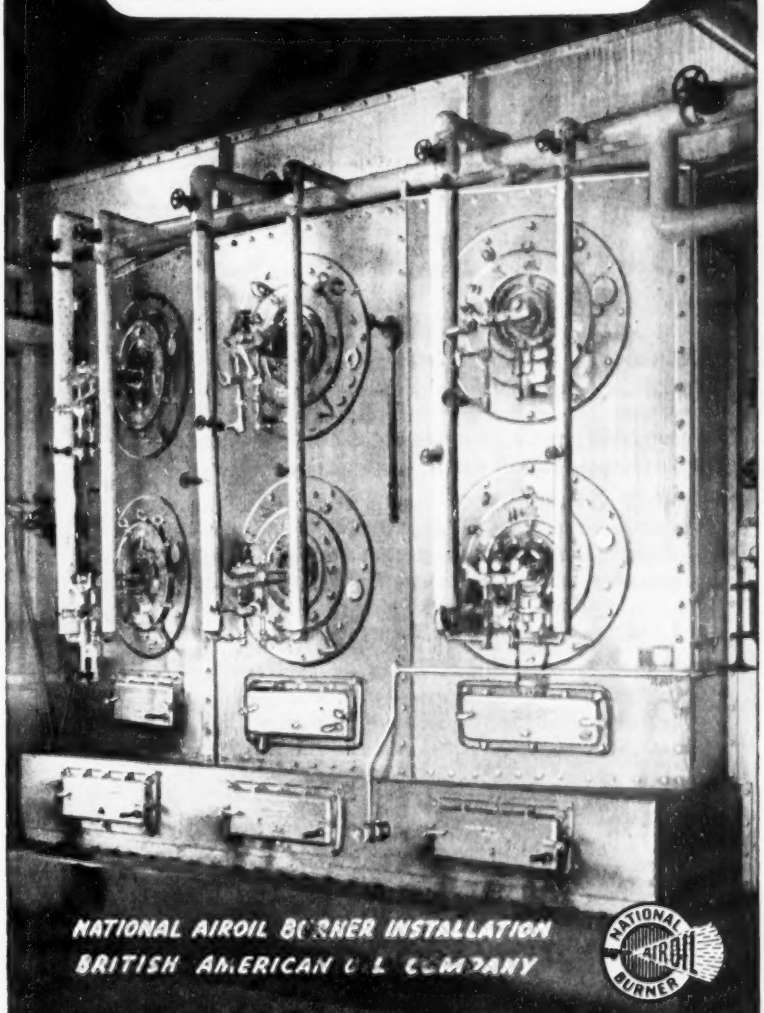

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no attempt to give proper care to produce.

Increasing numbers of markets are installing refrigerated cases. Losses can be greatly reduced by proper manipulation and care of these cases. In stores, shelf life of produce can be greatly extended by holding packages in the meat cooler and keeping only enough on display counter to satisfy needs.

Digest from "Refrigeration of Prepackaged Fresh Fruits and Vegetables," by H. A. Schomer, *Refrigeration Engineering*, 742-44, July, 1953.

### New Volatile Flavor Process

Capturing volatile fruit flavors in their original, natural condition with quality and flavor unchanged is the object of a recently patented process.

Employed are a falling film evaporator operating at approximately 20 mm. Hg pressure and a temperature of 70 deg. F., and 3 condensers maintained at approximately 50, 32 and −285 F., respectively.

In the process, fresh pressed fruit juice is introduced and circulated through the evaporator. Vapors flashing from the separator are partially condensed in the surface condenser of the evaporator. Remaining vapors go to the second condenser where a part is liquefied and forms as a solid. Vapors then go to final condenser where a temperature of −285 F. is maintained by means of liquid nitrogen.

Operation is continued until approximately 10 percent of original juice is evaporated. Then 2nd and 3rd stage condensers are disconnected and evaporation continued until a concentrate is obtained. Condensate from 2nd and 3rd stages is combined with concentrate from evaporator to form product that reconstitutes with water to simulate original juice in flavor.

Digest from U. S. Patent 2,641,550, issued June 9, 1953, on an application dated July 17, 1951, to K. G. Dykstra, Albion, N. Y. and D. De Felice, Morristown, N. J.

## CEREAL PRODUCTS

### Adding Copper to Barley Cuts Malting Losses

Malting losses can be appreciably reduced by the application of $CuSO_4$ to the growing malt on the 5th day of germination. A solution of 80 g. $CuSO_4$ in 10 liters of water is applied evenly to 4,000 kg. of germinating grain. In preliminary experiments 6 alternate 4,000 kg. maltings were so treated. Malt yields were 20,300 kg. for the treated barley compared to 20,020 kg. for the controls.

More extensive trials during 1951

and 52 indicated increased malt yields of 0.6–2.15 percent of barley weights, depending on variety, season of the year, and malting conditions. Treated malts also showed 0.75 to 1.58 percent higher extract yields (dry basis).

Worts from treated malts were paler, suggesting that the extra copper prevented darkening during kilning. Diastatic power was about 10 percent less in the treated malts, a factor that limits the copper treatment. Trials have indicated than application of 120 g. $CuSO_4$ to 4,000 kg. of barley will give even better yields of malt, but at the expense of its diastatic power of the malt.

Increased copper content (15.2 ppm. compared to 8.8 ppm. in control malt) does not lead to an increase in beer copper though it is in somewhat higher (2.7 ppm. compared to 2.0 ppm.) in kettle wort.

Both control and copper-treated malts produced beers of 0.6 ppm. copper. Clarity and stability estimates for the control beer were somewhat better however. About half the copper in barley, including that added during the malting, goes into the sprouts (rootlets) which are dried for animals feeds. Added copper makes the sprouts a better feedstuff for ruminants.

Digest from "The Reduction of Malting Losses by the Use of Copper Sulphate," by J. G. Lambert, *L'Echo de la Brasserie* 9, 16, 389-400, April 17, 1953.

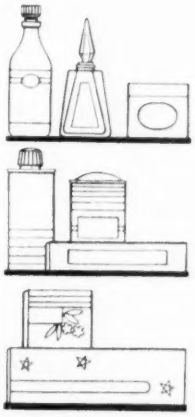
## BEVERAGES

### Characteristics of Beer Protein

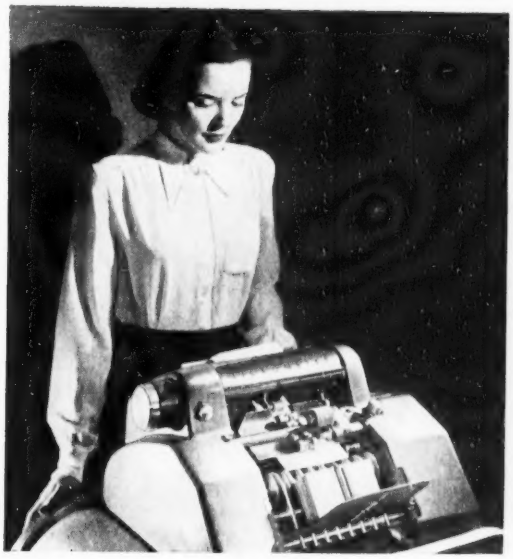
Beer proteins are actually degraded proteins formed from raw materials by the brewing processes. The degraded products have molecular weights high enough to permit their separation by dialysis or by saturation of beer with ammonium sulfate. Proteins separated in this way have been fractionated by ammonium sulfate precipitation and by an ethanol precipitation method adapted from blood plasma fractionation.

Electrophoretic fractionation methods gave proteins as complex as the starting materials. By means of ethanol six fractions were obtained, which, with the alcohol-and alkali-soluble proteins, make up most of the high molecular weight nitrogenous constituents of beer. Fractions separated varied from white to dark brown in color, were amorphous in appearance, and contained 4—16 percent nitrogen.

Most abundant fraction (present to extent of 0.0095 percent) contains 12 percent nitrogen, 1.2 percent sulfur, is soluble in 80 percent alcohol and

*The Tickometer offers packers and processors an easier and cheaper way of identifying and dating products.*



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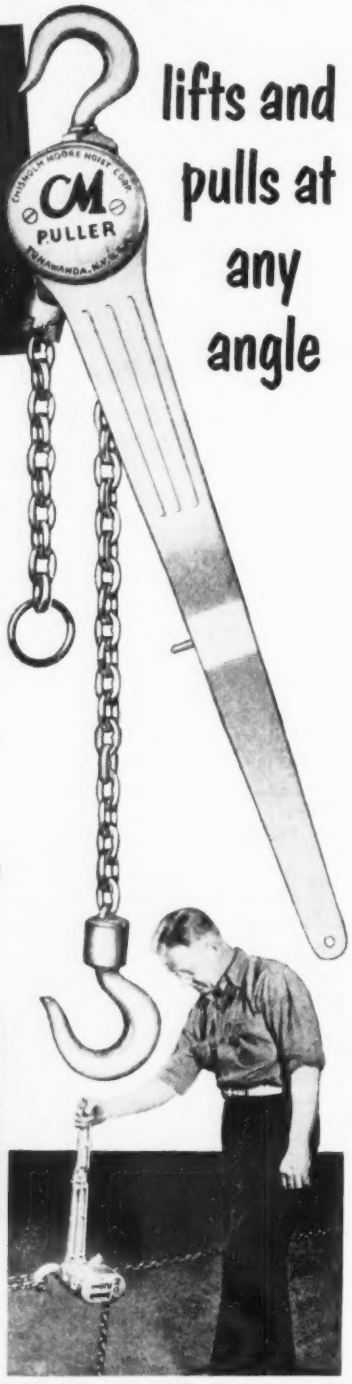


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dissolves rapidly in water. Several of the fractions yield more or less stable foams in water solutions (0.02 percent), but not all of the foams were persistent.

Digest from "Isolation, Separation, and Characterization of Beer Protein," by B. L. Seallet, J. J. Stansbrey, F. W. Small, Jr., and P. F. Gibbs, *Industrial & Engineering Chemistry*, 1016-22, May, 1953.

### Coffee Substitute

Extracting syrup from alfalfa or other forage plants, then drying to form a coffee substitute is the object of a recently granted patent.

In process, freshly harvested plants are passed through a hammer mill and then delivered to a pulper where part of juice is removed. Remainder is removed by pressing rolls or other suitable means.

Juices are combined and heated to approximately 180 F. to coagulate protein which is separated from the carbohydrates in solution by centrifuging or filtering. Liquid is concentrated at low temperature in vacuum evaporator, dried and ground for use as coffee substitute.

Digest from U. S. Patent 2,639,236, issued May 19, 1953 on an application dated Oct. 18, 1950, to J. H. Zachary, Arlington, Calif.

## FATS & OILS

### Antioxidant Properties Of Osage Oranges

During an investigation of industrial potentialities of Osage orange fruit, it was observed that part of material is remarkably effective in retarding oxidative rancidity in lard and other similar substances.

Antioxidant potency was highest in fruit bulk. Pigments were second, followed by sap, seeds, and core. Tests were made by direct addition of these substances to lard, or by using benzene or ethyl ether extracts.

Principal pigments of Osage orange fruit are pomiferin and osajin, yellow crystalline compounds. Within the fruit they are mixed with a brown noncrystalline material that is extracted with them. Separation into its components gives substances that have lower antioxidative potencies than when used as a mixture.

Potency of antioxidant is affected by temperature at which fruit is dried before extraction. Comparisons were made between lots dried at 80 C. in a vacuum oven and others dried at 120 C. in an air oven. In general, lots dried at higher temperature showed highest AOM stability.

A series of tests was run to deter-

**Food Engineering Reports**
**LATEST TECHNICAL NEWS**
**In Keeping Up With Field . . . page 215**

mine effect of various acids thought to have synergistic action. Tartaric, oxalic, malonic, citric, and ascorbic acids gave best responses. In comparative tests on lard with NDGA, G4C and BHA, on a unit-weight basis, the Osage orange antioxidant was about one-fourth as active as NDGA and about twice as active as either of the others.

Economic advantages of Osage orange antioxidant are: Plentiful supply, renewable annually; high concentration (10 percent by weight) of the active principles in the dried fruit; extracted residue useful as raw material for further processing, or as a component of mixed feeds. In concentrations required for antioxidant use, the Osage orange product imparts no noticeable flavor or odor, and is non-toxic.

Digest from "Antioxidant Material from the Osage Orange (Bois D'Arc) Fruit," by John R. Clopton, *Journal of the American Oil Chemists' Society*, 156-59, April, 1953.

## MISCELLANEOUS

### Vibrations Plus Pressure Feature New Homogenizer

According to recent patent specifications, a novel method of homogenization comprises subjecting liquid to rapid vibration while passing under pressure through restricted orifice. Rate of vibration is of the order of 20,000 cycles per sec. Feature of invention resides in imparting vibrations to material by varying magnetization of metal member possessing magnetostrictive properties.

In apparatus designed to carry out process, vibratory member is fixed at one end and free at other. Free end is tapered to a point which operates as a valve in small orifice through which liquid is forced. Tip of vibratory member is accurately located relative to orifice before oscillatory current is energized.

In operation, vibrations act in same direction as flow of material, and supplement disruptive force of pressure in small orifice. Thus, it is claimed that lower pressure can be used for a desired degree of homogenization.

Digest from U. S. Patent 2,621,905, issued Dec. 16, 1952, on an application dated May 22, 1950, to F. H. Daniell, East Malvern, Australia, assigned to Kraft Walker Cheese Co. Prop. Ltd., S. Melbourne, Victoria, Australia.

**...Flavor with extra Sales Appeal:**
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● on almost anything, wet or dry, *Pervenac* labels go on quickly, neatly, and permanently. Whether your product goes underwater in an ice chest or in the hot spot over the stove, the label stays on and stays good-looking.

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When you want better labels and better labeling — in every way — step up to *Pervenac*.

Ask your printer to get samples of *Pervenac* from his Nashua merchant.

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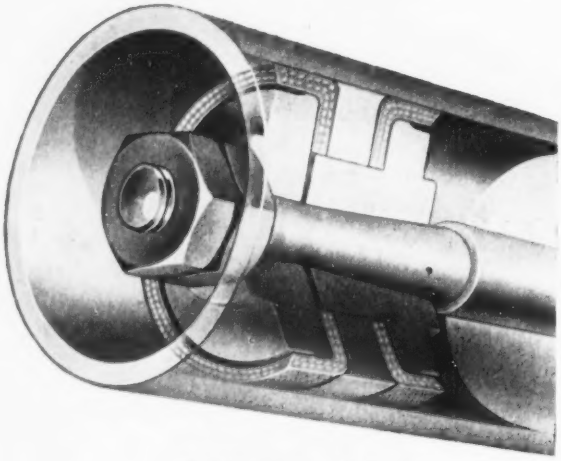
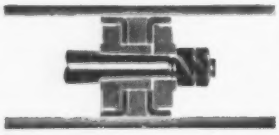
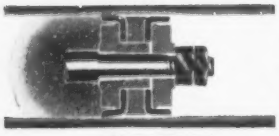


Phantom cutaway showing a typical Pumcup piston assembly.

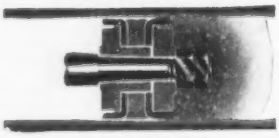
DIAGRAM OF DARCOVA PUMCUP ACTION (greatly exaggerated)



NORMAL: BOTH PUMCUPS RELAXED



UNDER PRESSURE: PUMCUPS SEAL AGAINST CYLINDER DESPITE WEAR, MINIMIZING SLIPPAGE



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**1.** Texture engineering that not only increases volumetric efficiency, but keeps it high with no appreciable fluid slippage for the entire life of the Pumcups.

**2.** Darcova Composition Pumcups give many times the life of other types of piston packing . . . *at least 3 to 1!*

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**PUMCUPS**


## Payload-Upping

—*Continued from page 68*

the frame is connected to the trailer floor or bed by means of a hinged fifth wheel mounted on the frame. The undercarriage thus has two fifth wheels, one between the top of the frame and the trailer floor and the other between the top of the dolly and the bottom of the frame. The hinged fifth wheel provides a flexible mounting to the trailer floor.

### Even Distribution

Due to this flexibility, road shocks are absorbed, and trailer performance is smooth by virtue of the even distribution of the load to both axles when going over bumps and sharply changing inclines. The undercarriage is completely self-steering. Both axles are towed, neither is pushed.

Controlled by the tongues, the front wheels answer the natural tendency to swing out on a curve, following a course approximately the same, but slightly inside, the path of the tractor drive wheels. And through action of the hinged fifth wheel, the rear wheels follow a proper turn radius inside the front-wheel track.

Scuffing due to grinding action on the tires when turning corners is greatly reduced because of the self-steering design that permits travel of axle and tires to approximately the path of the tractor drive wheels. Accordingly, tests indicate considerably extended life of tire casings.

### New Performance on Turns

Because of the self-steering and free-following characteristics, trailers negotiate turns not possible with a standard tandem or single axle suspension. A 35 ft. trailer mounted on a Hoobler undercarriage can make a complete U-turn on a 28 ft. radius without tire scuffing. And so, such a trailer can easily make a right-angle turn out from a 20 ft. alley and into street of the same width without cutting the curb, coming parallel to the street curb by the time it has traveled its own length.

Design of the unit reduces the tendency of a trailer to sway, even with high load. The undercarriage steers itself out of skids on slippery pavements. Therefore, due to the unique "jack-knifing" construction, one of the most frequent causes of trailer accidents is avoided.

Since towing is easier, tractor fuel consumption is reduced. And very frequently a smaller-size tractor can handle a trailer once it is equipped with the new unit.

As an operational feature, the undercarriage may be equipped with an air-operated back-up clamp controlled by a valve in the trailer cab. This device is operable within the radial movement of the undercarriage in either straight backing or on a curve.

—*End*—

## Insulating Savings

—*Continued from page 63*

used. For maximum neatness of finish and durability, the factory-applied canvas is removed from sectional insulation, and the section is wired into place with all joints closely butted and pointed up with insulating cement. A wrap of rosin-sized paper is then applied over the insulation, and a jacket of 8-oz. canvas is sewed on.

Where this type of finish is not warranted, the factory-applied canvas may be end- and side-lap pasted, with the insulation wired or banded to hold it.

Flanges, valves, and fittings should also be insulated, since they represent a loss of heat that is often overlooked. For example, an uninsulated, standard flanged coupling in a 6-in. pipe line will waste as much heat as a foot of 6-in. pipe—possibly ¾ ton of coal per year just for this coupling.

Large flanges, valves, and fittings may be insulated with blocks, segments, or sections. All spaces and joints are filled and pointed up with insulating cement, and the surface is finished with ¾-in. layers of asbestos insulation and hard-finish cement, applied over mesh wire. If these pipe units are too small to permit the ready application of molded insulation, the job may be accomplished with an appropriate thickness of asbestos insulating cement, applied in two or more layers and troweled smooth. If desired, a canvas jacket may be pasted or sewed on.

### Weatherproofing Tips

Where food processing equipment and piping is located outdoors, some means of weatherproofing the insulation must be employed. This may be accomplished through application of asphalt-saturated asbestos roofing-felt or an asphaltic plastic compound.

It is interesting to note that the Gerber plant roofing-felt was used not only on the outdoor ductwork, but also on indoor piping instead of the conventional canvas jacket. Since food packing plant equipment must be washed in many instances, the weatherproof finish keeps the insulation dry.

*End* (*Resume reading on page 64*)


For LONG RANGE EFFICIENCY

# insulate with Mundet Corkboard and Cork Pipe Covering...

Profitable production of frozen foods depends upon most efficient control of low temperature for freezers, hardening rooms, refrigerated storage and low temperature pipe lines. For long range economy and top efficiency, be sure you have MUNDET CORKBOARD for floors, walls, ceilings; MUNDET CORK PIPE COVERING for cold lines.

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**2.** CORK IS LONG-LASTING! Cork has high structural strength and is a most durable material. It continues to serve for many years at highest efficiency.

**3.** THROUGH MORE THAN 80 YEARS AS CORK SPECIALISTS, we are able to preserve Corks' natural advantages in Mundet insulating products. Mundet engineers give you responsible assistance in building or expanding plant facilities. Let us help you secure low operating cost and maximum service.

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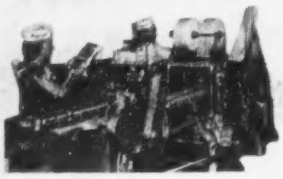

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# Questions & Answers

## THIS MONTH'S PROBLEM

*Question—Converting a batch-type, vacuum-pan cooking process for making preserves to a continuous one has got us over a barrel. Have you any ideas?*

### Answer to July Problem

*The Question Was—We are considering manufacturing starch-type puddings—vanilla, butterscotch, and chocolate. Can you tell us how to make them?*

Answer—Here are formulas for the three flavored starch-type puddings:

*Vanilla Pudding* — Confectioner's sugar, 50 lb.; dextrose (anhydrous), 106 lb.; corn starch, 55 lb.; arrowroot starch, 2 lb.; salt (fine), 2½ lb.; vanillin, to suit; and color (tartrazine, 3 oz.; orange #1, ¼ oz.; and water, 1 qt.), 3½ fl. oz.

*Butterscotch Pudding*—Confectioner's sugar, 75 lb.; dextrose (anhydrous), 48 lb.; brown sugar (fine), 9 lb.; corn starch, 37 lb.; salt (fine), 5 lb.; butterscotch flavor, to suit; and color (tartrazine, 1.9 oz.; ponceau 3R, 5.4 oz.; fast green F.C.F., 0.03 oz.), 22 fl. oz.

*Chocolate Pudding*—Confectioner's sugar, 150 lb.; corn starch, 62½ lb.; tapioca starch, 22 lb.; cocoa, 37½ lb.; salt (fine), 2½ lb.; and vanillin, 2½ oz.

Processing details are simple. Merely introduce the ingredients, in order given, into an horizontal batch-type ribbon mixer. Blend for 20 to 30 min., run through sifter, and feed into hopper of filling machine. Then fill into wax paper-lined cartons.

### More on Quick-Cured Bacon

Referring to your July Q&A, "Re Quick-Cured Bacon," we believe that the answer created an erroneous impression.

Thermocure bacon has a long keeping quality. It remains sweet and does not turn rancid as quickly as sweet pickled or ordinary dry-cured bacon. Too, it has a superior meat flavor as a result of its freshness.

Some observations made on Thermocure bacon are attributed to a confusion between flavor and salt.

One of the important assets of Thermocure bacon is that it can be produced at a medium salt level, which, through experience, has been found desirable by a large proportion of the consumers. Most processors producing Thermocure bacon prefer a product with a relatively low salt content. Consequently, some tasters accustomed to bacon with a high salt content feel that the flavor of the bacon is bland.

Our firm was instrumental in teaching packers the technique of artery-pumping hams. As a result, we were chiefly responsible for reducing salt content of cured hams. When the artery-pumping method was started, complaints arose that the hams were bland or mild-flavored. However, in time, packers learned that consumers wanted cured meats with a low salt level.—*C. L. Griffith, Griffith Laboratories, Inc., Chicago.*

### Stabilizing Chocolate Syrup

*Question—Our firm is making a chocolate syrup for soda fountains. It consists of milk (3.5 percent butterfat), 100 gal.; cane sugar, 1,000 lb.; Dutch-processed cocoa, 200 lb.; and salt, 2 lb. The ingredients are mixed, heated to 200 deg. F. in a 200 gal. capacity pasteurizer, homogenized at a pressure of 1,000 psi., and then run over a cabinet-type cooler. Do you have any suggestions on how much Irish moss stabilizer to use in this batch? What specific type of stabilizer should be used, and when should it be applied to the batch?*

Answer—Your chocolate fountain syrup contains an unusually high amount of milk solids. However, since these types of chocolate syrups vary in respect to milk solids, cocoa, type of cocoa, and final properties desired, no hard and fast rules can be set.

Our SeaKem Type 5 stabilizer has been used in chocolate fountain syrups to impart a slight body and maintain suspension of the cocoa, especially in those syrups requiring a minimum amount of heat.

For your formulation, we suggest using approximately 0.1 percent of SeaKem Type 5 stabilizer. You can then vary the amount to suit your needs. Mix stabilizer with approximately five times its weight of sugar, and then introduce it into syrup.

Check pH of syrup to make certain that cocoa does not bring it below 6.5. If pH goes below 6.0, difficulties due to hydrolysis may occur. If pH is too low, then adjust it to 6.5-6.7 with bicarbonate of soda.

The dry sugar-stabilizer mix can be added to the syrup at the start of the cook, along with the cocoa.—*Leonard Stoloff, Seaplant Chemical Corp., New Bedford, Mass.*

### Checking Glass Shipments

*Question—Our food products are packed in glass containers of ranging styles and sizes. These containers are purchased from several suppliers. When changing from one supply of containers to another, or when starting on a new shipment of glass, we encounter excessive interruptions or lost production time on our filling lines. Also, we feel that our complaints on defective containers may be somewhat high. Is there a checkup program that we might follow to improve our control over incoming shipments of glass containers in an effort to minimize production-line downtime?*

Answer—First step is to sit down with representatives from your suppliers of glass containers and go over, in detail, your requirements. By informing them of your overflow capacities and dimensional tolerances as well as quality factors such as freedom from discoloration, cracks, and other defects, and then comparing them with the tolerances your suppliers are prepared to guarantee, it should be possible to set up purchase specifications acceptable to all parties.

Once such specifications are agreed upon and your purchases are placed on this basis, your problem becomes one of identifying and sampling each shipment received, and checking samples for adherence to specifications.

It is general practice to segregate shipments and tag each pallet load with car number or other identifying mark. Size and manner of taking a sample may be determined in various ways, according to precision required statistically, and, of course, amount of money you wish to spend on this control system.

It would be well for you to work out the various tests you intend to carry out in conjunction with your sup-

### How Would *You* Do It?

**Readers are invited to submit to FOOD ENGINEERING answers to questions to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.**

#### What Is *Your* Problem?

**Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.**

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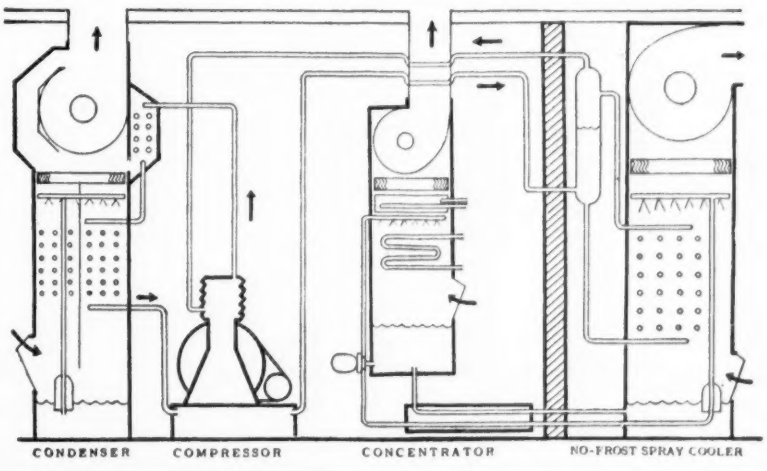


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pliers, so that standard techniques can be used. This will obviate any disagreement on test results and will give you the benefit of the container manufacturer's greater familiarity with testing methods and equipment.

It is also advisable to work out a standard form for tabulating and reporting results of the sampling and testing. Provide space on form for identifying each shipment as well as essential information on factors checked—percentage outside tolerance, and the like. This form will serve as the basis for releasing supplies, upon approval, from temporary storage to production lines and for making claims against the supplier in event of rejections.

As a supplement to laboratory tests, you may wish to set aside a few cases from each shipment for actual production-line testing to be carried out at the most convenient time. This procedure is most valuable when difficulties are most likely to occur, such as changing to a new style or size container or vendor.

We know of one firm that has inspectors on their high-speed glass-filling lines making visual checks of all their containers. Special inspection stations are provided with suitable lighting and mirrors, with each inspector removing questionable containers and setting them aside. These questionable containers are later examined more minutely at another inspection station. Good containers are returned to production, while defective ones are recorded and then reported to the supplier.

### Freeze-Killing *C. botulinum*

*Question—I know the effects of the lethal heat rate of C. botulinum, but do not know the lethal freezing rate for spores of this organism. Can spores of these strains of bacteria be killed by freezing? If so, at what minimum temperature?*

Answer—To the best of our knowledge, there is no lethal freezing rate for *C. botulinum*. While extreme cold markedly reduces the number of viable cells in a food, many do survive. And such is the case with *C. botulinum*—particularly this organism's more resistant spores.

In checking the library (James, *J. Inf. Dis.*, 52, 236-241, 1933), we learn that dried *C. botulinum* spores withstood dry-ice freezing. Spores were suspended in Sorensen's buffer solution (pH 6.9), heated, and frozen solid with dry ice. When immediately defrosted, or even held frozen for nine days, no reduction was noted in number of living spores.

### Controlling Mold Growth

*Question—Mold growth is a serious problem in our bakery. We must periodically wash visible mold growth from walls and ceiling with a 1 percent chlorine solution. Also, we are faced with adverse consumer reaction due to return of moldy goods. We've heard that coating walls and ceilings with a fungicidal paint would prevent visible mold growth. Is there such a paint? If so, what is it? And is it acceptable to government regulatory agencies?*

Answer—According to researchers at Armour and Company, Chicago, the only fungicide added to paint that met with greatest acceptability was Cunilate (solubilized copper-8-quinolinolate).

Other fungicides tested at laboratory- and plant-level included: Salicylanide, chlorophenol, quaterneries, tetra-chloro-phenol, phenyl-mercury-naphthenate, and copper-8-hydroxy-quinolinolate.

To the best of our knowledge, Cunilate is acceptable to government regulatory agencies. It also meets four other requirements for an acceptable fungicide: (1) Destroys all types of molds in concentrations used, without being toxic to humans; (2) is tasteless and odorless; (3) does not give an unpleasant color to the paint; and (4) is not harmful to surfaces upon which it is applied.

Areas in a plant coated with Cunilate paint showed no visible mold growth after two years. Similar areas coated with paint containing no fungicide were well covered with mold within 3 mo.

Recommended concentration is 10 fl. oz. of Cunilate to 1 gal. of paint.

Before using this paint it is necessary to soak mold-covered surfaces for at least 20 min. with a 0.5 percent solution of chlorine, rinse, and then scrape off any flaking paint.

### Processing Honey Butter

*Question—Can you offer me any information on manufacture of honey butter? I wish to pack this product in 6- or 8-oz. jars with vacuum-seal caps.*

Answer—Extracted honey, or even maple syrup, can be formed into a permanent emulsion that will resist high temperatures and retain a creamy, non-grainy appearance.

It is done by beating to a froth 1 lb. of powdered egg albumen with 4 lb. of cold water. To this froth add 16 gal. of 180-deg. F. honey, and mix about 20 min. until a creamy, grain-free paste is formed. Then fill hot into jars and cap.


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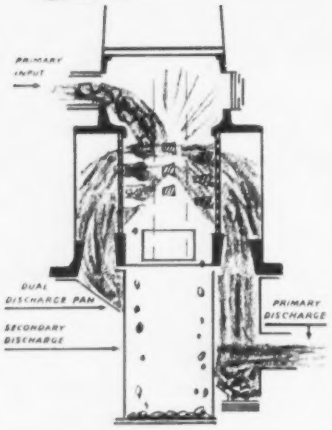


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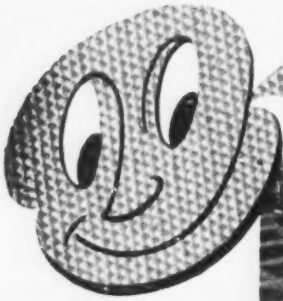

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## Figuring Out Blends

*Question*—*In batch-compounding, we frequently blend two syrups or juices of different, but known, solids to produce a mixture of a desired concentration. This now requires computation of the proportions by the laboratory, with the resulting loss of time. We believe there is some sort of graphical short-cut that our foremen could employ to obtain answers much quicker. Can you tell us what it might be?*

Answer—Your problem is, of course, a common one, and you are correct in your thought that a graphical short-cut exists. It is a simple matter to compute proportions of the two components for such blends as those based upon acidity, salinity, soluble solids, and the like.

To do it, first draw a rectangle with the longer dimension horizontal, and then draw the diagonals. A free-hand sketch is adequate, since no scaling of dimensions is involved.

Now place figure for known concentration of component A at upper left-hand corner. Put a similar figure for component B at lower left-hand corner. Then add desired concentration of blend at intersection of diagonals.

Similarly, take numerical difference between the lower left-hand and center figures and enter it at the upper right-hand corner. The resulting upper right-hand figure then gives you the number of parts of component A and lower right-hand figure the number of parts of component B, which will yield desired concentration when blended.

As soon as these proportions are established, it is, of course, very easy to formulate a batch of any given size.

## Making Canned Tomato Soup

*Question*—*Can you supply me with complete details on manufacture of canned tomato soup? We are equipped to handle 500-lb. batches.*

Answer—The process basically involves concentrating tomatoes into a pulp, which is then cooked with other ingredients to make a soup.

In preparing the pulp, dump tomatoes on a conveyor, which carries them through a series of overhead water sprays, tumbler-type washer, water-soaker, and high-pressure water sprays. Transferred to a roller conveyor, tomatoes then travel past inspectors who trim defective tomatoes and reject bad ones.

Tomatoes continue through a chopper and then a cyclone where seeds and tailings are removed. Cyclone

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juice is next pumped to a glass-lined kettle with steam coils to be concentrated to a specific gravity of 1.0344. Pulp is then pumped through a 0.023-in. screen finisher with rotating brushes.

Now to cooking the soup. Add 414 lb. of tomato pulp into a stainless steel, steam-jacketed kettle, equipped with agitator. Start the agitator and dust 13¼ lb. of semolina into the pulp. (Semolina must be carefully dusted into the pulp to avoid lumping). Meanwhile, add salt, 7 lb.; sugar, 13 lb.; white pepper, 1½ oz.; garlic powder, ⅛ oz.; celery seed, ½ oz.; and onions, 1 lb. Dissolve 6 oz. of disodium phosphate in water and add to the batch.

Now turn on the steam and bring to a boil. At this stage, add 5 lb. of butter and time the boil for 3 min.—with agitation. Discharge soup into a holding tank and then pump through a finisher with an 0.027-in. screen to take out any large lumps.

One word of caution: Make sure that you frequently clean outside of the finisher screens, since the body, viscosity, and setting properties of the soup is influenced by operation of this unit. And for this reason, it might be best to set up two finishers in tandem. In this way, one can operate while the other is shut down for cleaning.

From the finisher, soup is pumped through a 0.033-in. screen to the filler bowl to be filled into cans, which are then sealed. Heat-processing time and temperature will depend upon the size cans used.

### Wine Clarified With Bentonite

*Question—We understand wines can be quickly clarified with bentonite. Can you tell us what it is and how to use it? Does it have an adverse effect on flavor of wines?*

Answer—Bentonite is a montmorillonite clay with significant swelling properties. Available in a powder form, it can easily be made up in a smooth suspension and added on a basis of about 1 lb. to 100 gal. of wine. An excess does not cause clouding of the wine. Settling takes place rapidly, and sediment is heavy and compact.

By heating wine to about 120 deg. F. and adding 1-2 lb. of bentonite per 1,000 gal., coagulation and settling of this fining agent can be speeded up.

Some believe that bentonite imparts a clay-type flavor to wines, others do not. If you detect an off-flavor, look into possibility of adding small amounts of activated carbon to bentonite-treated wine.


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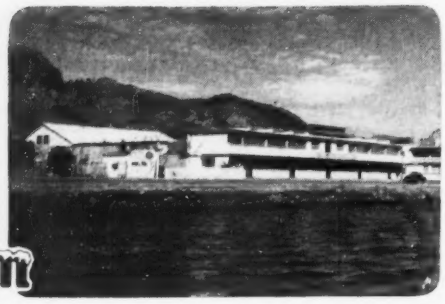

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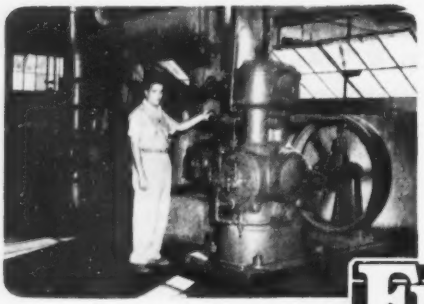

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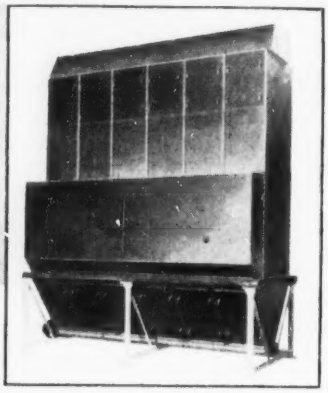

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### Preventing Kettles From Scoring

*Question*—*We have recently purchased a stainless-steel steam jacketed processing kettle, with stainless-steel scraper blades. We are already experiencing scoring of inner surface of kettle, and would like to know how this can be prevented, since it is essential that surface be scraped clean to prevent burn-on and to permit heat transfer.*

Answer — Stainless-to-stainless contact is likely the cause of scoring, and substitution of a different material for scraper blades themselves should correct difficulty. Many users employ a nickel alloy or "dairy metal" for this purpose, but in a few cases food product itself may be of such a corrosive nature that these alloys cannot be tolerated.

It is possible, of course, to use wooden scraper blades—maple, for example—but usually wood is frowned upon from a sanitation viewpoint. It is porous, tends to absorb food materials, and is almost impossible to keep bacteriologically clean.

There are certain types of plastic materials now on the market, which have been quite successfully used for scraper blades in mutating type heat exchangers and which should prove equally useful for your type of application. Things to consider are, of course, freedom from toxicity, odor, flavor, or color, and resistance to heat of jacket.

Dilecto (Grade C), Teflon, or Kel-F should be satisfactory.

### Wants to Make Crab Cakes

*Question*—*We are manufacturers of frozen specialty items and would like to expand our line. Can you furnish us with formulas and directions for preparing frozen fish and crab cakes?*

Answer—To manufacture fish cakes, soak 25 lb. of shredded salt cod for several hours in cold water. Then break fish into small pieces, place in steam-jacketed kettle, add water and heat to boiling. Drain water and boil fish together with 50 lb. of peeled potatoes.

After both are thoroughly cooked, drain off liquid and run batch through a grinder with a ¼ in. plate. Introduce mixture into a mixing bowl and add eggs (beaten), 35 lb.; butter or margarine, 2½ lb.; diced onions, 5 lb.; and pepper, about 1 oz.

Using a vertical-type mixer, thoroughly whip all ingredients. Form mixture into cakes of desired size, dip into beaten eggs, roll in soft bread crumbs, and deep-fat fry (375 deg.

F.) until light golden brown. Pack enough fish cakes into cartons to make an 8-, 12-, or 16-oz. package. Overwrap and freeze.

Crab cakes can be prepared in this manner: Melt butter or margarine, 2 lb., add ground onions, 2 lb., and cook until onions are soft and yellow. Mix with 25 lb. crab meat, 6 lb. bread crumbs (soft), 3 lb. eggs, ½ lb. dry mustard, and ½ lb. of Worcestershire sauce. Add salt and paprika to taste. Form into cakes, dip into beaten eggs, roll in bread crumbs, deep-fat fry, package, and freeze.

### Poppy Seed Filling

*Question—Can you furnish me with a formula and directions for preparing a poppy seed filling to be used for breakfast rolls?*

Answer—Grind ¾ lb. of dates or mixed candied fruits and 2⅝ lb. of raisins (seedless). Add 2 lb. of milk and 1½ lb. of poppy seeds. Bring mixture to a boil, and then heat gently, with mixing, until milk is almost absorbed. Introduce sugar, 2 lb.; honey, 1 lb.; grated lemon rind, 2 oz.; butter or margarine, ¼ lb.; and ground cinnamon, 1 oz.

Again bring to a boil and cook gently with stirring for 5 min. Then cool before using.—*Formula from American Spice Trade Assn.*

### Making Marshmallow

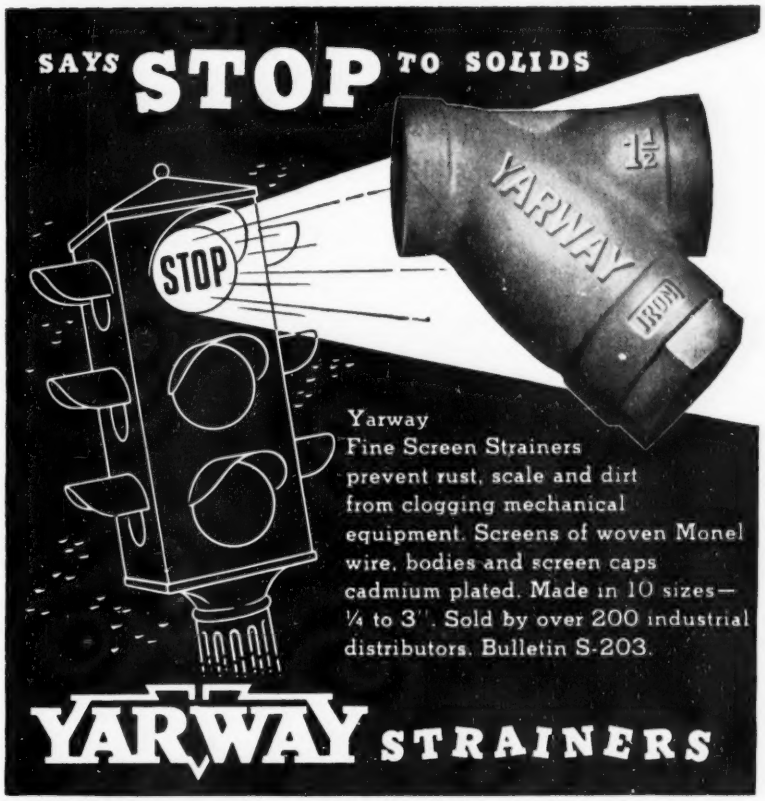
*Question—We are interested in manufacturing a good semi-liquid marshmallow to be packed into jars, hence would like you to give us a formula and processing details. Incidentally, we are considering using a vertical beater.*

Answer—To prepare an approximate 54-lb. batch, soak 1 lb. of egg albumin (powdered) in 3 lb. of water. Occasionally stir until albumin is completely dissolved, and then introduce solution into the beater with an 80-qt. bowl.

Now add salt, 2 oz.; tartaric acid (powdered), ¾ oz.; and corn syrup, 5 lb. Whip mixture until light and stiff.

Meanwhile, heat 45 lb. of corn syrup to 230 deg. F. Then gradually add the hot syrup to the mixer, while beating at medium speed. Flow of hot syrup should be adjusted so that temperature of mix will be about 165 deg. F. after all of syrup has been introduced. Continue beating until desired consistency is obtained.

Just prior to finishing, add vanilla (to suit) and mix in well. Then immediately fill into jars while warm, cap, and label.—*Formula from A. E. Staley Mfg. Co., Decatur, Ill.*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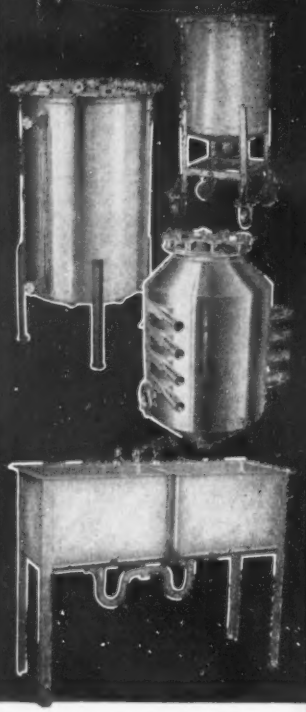

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# Useful New Books & Government Publications

## New Food Sources?

ALGAL CULTURE—FROM LABORATORY TO PILOT PLANT. *Edited by John S. Burlew. Published by Carnegie Institution of Washington D. C. 1953. 357pages; 6¾x10 in., paper. Price* $1.25.

World need for additional sources of high-protein food is so great, especially in over-populated areas, that serious effort in tracking down promising leads is warranted. Rather than let development of algal culture proceed by chance, the Carnegie Institution of Washington, D. C. has been actively carrying it on to secure enough information to assess it fairly. "At this stage we are not able to recommend any particular type of installation or to state positively the economic possibilities of this method of producing foodstuffs. The ramifications of the subject are so wide that we cannot yet be sure what form the future development may take."

Partial answers to the principal questions have been obtained by pilot plant work financed by the Institution. The alga *Chlorella* has been grown and harvested continuously on a large scale; it has nutritive value in animal feeding; it or one of the other algae may contain useful chemical raw materials; and estimates have been made from available data as to possible yields of *Chlorella* in commercial quantities.

Mass culture of algae began as an offshoot of the Institution's research on photosynthesis. Several species were used but particular attention was paid to *Chlorella* because of the broad range of environmental conditions under which it would grow and because it has been widely studied in other aspects.

Most of the monograph is made up of reports of studies financed by the Institution. However, parallel investigations in other countries are also included. Hope is that this "progress report" will stimulate further interest and increased progress toward large-scale culture of algae.

Authors represented in the volume include a number of the Carnegie Institution staff, and research workers at the Universities of Texas and Maryland, the Agricultural University at Wageningen (The Netherlands), University of Tokyo, University of Göttingen, Kohlenstoffbiologische Forschungsstation E. V. at Essen-Bredeney, (Germany), University College (London), Imperial Chemical Industries, Ltd. at Bracknell (England), Leprocomio de Cabo Blanco at Maiquetia (Venezuela), Hebrew University (Jerusalem), Tokugawa Institution for Biological Research (Tokyo), Arthur D. Littel, Inc. (Boston), and Merck & Co., Inc. (Rahway, N. J.).

The book closes with an extensive bibliography and what appears to be an adequate index.

## Gelatine and Jellies

GELATINE DESSERTS AND TABLE JELLIES. *By A. E. Williams. Published by Food Trade Press, Ltd., 7, Garrick St., London WC2. 1953. 160 pages; 5½x8½ in., cloth. Price* 30s.

Written primarily as a handbook for processors of gelatine desserts and table jellies, this book will also be of interest to actual gelatine manufacturers and other food processors using gelatine in their products.

Volume discusses food value, chemistry, manufacture, and testing of gelatine. Also included are chapters on manufacture of table jellies, examples of gelatine desserts, non-gelatine gels, and fruit jellies.

Separate chapters deal with the use of homogenizers an methods of packaging. Indexed.

## Contract Packagers

DIRECTORY OF CONTRACT PACKAGERS AND THEIR FACILITIES. *Second Edition. Compiled and published by Packaging Institute, 342 Madison Ave., New York 17. 1953. 71 pages; 8½x11 in., paper. Price* $2.

This directory gives comprehensive data about packaging equipment and facilities of 81 contract packagers, together with information about products that will be accepted or refused, and shipping facilities.

Feature of this second edition is a handy 15-page geographical index which simplifies locating packagers in a particular area.

## Ion Exchange Method

ION EXCHANGERS IN ANALYTICAL CHEMISTRY. *By Olof Samuelson. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. 1953. 291 pages; 6x9¼ in., cloth. Price* $6.50.

Book gives a comprehensive, complete, and progressive explanation of

the ion exchange method in detail.

After an introductory discussion on scope of method volume is divided into three parts. First is a general survey on fundamental properties of ion exchange resins, ion exchange equilibria, and kinetics. Second section covers techniques of ion exchange separations for analytical purposes and ion exchange chromatography. The last and major part of book—applications—deals with practical application of ion exchange method in three divisions within the science: inorganic analysis, organic analysis, and biochemical analysis. In this section author goes into use of the method for aldehydes and ketones, sugars and polyhydric alcohols, alkaloids, amino acids, vitamins, and antibiotics.

The two final chapters investigate the complex salts and miscellaneous applications not treated elsewhere in text.

Author is professor of engineering chemistry, Chalmers Institute of Technology, Goteborg, Sweden.

## Government Publications

LOSS AND DAMAGE IN RAIL TRANSPORTATION OF DRESSED BEEF. *Production & Marketing Admin., USDA, Washington 25, D. C.* Shows that more care in loading and better maintenance of refrigerator car running gears are needed to reduce transit damage.

REVISED GRAIN MOISTURE CONVERSION CHARTS FOR TAG-HEPPENSTALL TESTER. *Grain Branch, Production & Marketing Administration, USDA, Washington 25, D. C.* For use by licensed or supervising grain inspectors, for barley, oats, and rye, beginning July 1.

*These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.*

SUMMARY OF REGIONAL COLD STORAGE HOLDINGS FOR 1952. *USDA, Production and Marketing Administration, March 1953.* 30 pages. Statistical contents self-evident from title; resumes annual series begun in 1946 (no 1951 summary was issued).

REVIEW OF PROGRAM OPERATIONS, COMMODITY CREDIT CORPORATION, FISCAL 1952. *USDA.* 21 pages plus 12 detailed tables. Covers 12-month period ending June 30, 1952.


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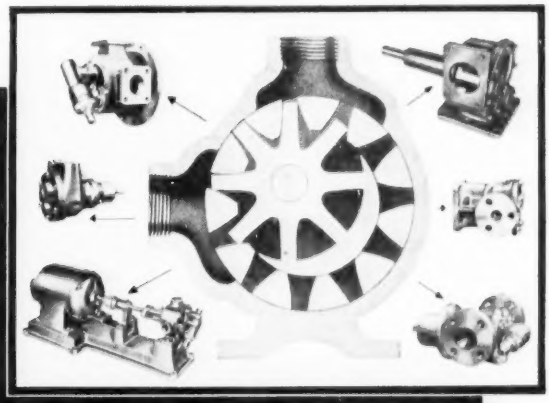

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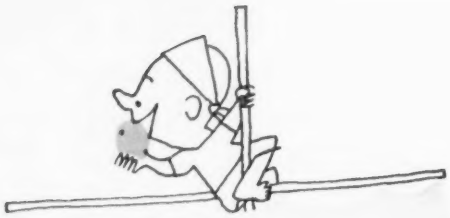

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Norda Peach builds nice, paying business:
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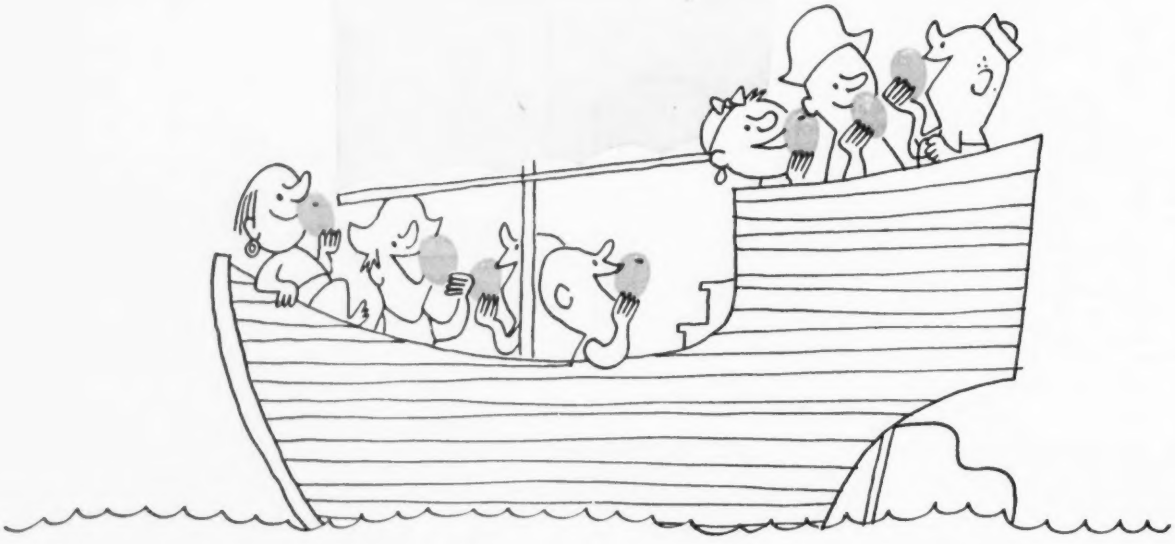

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# KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

## QM Augments Statistics

To put new emphasis on the computational approach, statistical services of the Quartermaster Food & Container Institute for the Armed Forces, Chicago, have now been organized as the Statistical Design & Analysis Office. This new facility is incorporated in the Office of the Scientific Director.

The program aims at joint planning of research among the various divisions of the Institute along with accelerated evaluations of results. Food and container experts will be advised concerning statistical planning of experimental work, and attention will be given to design and methods.

## Stale Bread Exonerated

Confirmation that stale and fresh breads are equally digestible is found in the recent work of Drs. S. S. Jackel, A. S. Schultz, and W. E. Schrader, of Fleischmann Laboratories, Standard Brands, Inc., N. Y. C.

Exploring the possibilities of using the enzyme, bacterial alpha-amylase, to retard bread staling, the researchers initially believed they saw indications that body digestive juices worked more easily on the fresh product. But it was then discovered that both breads broken into comparible particle sizes were acted upon equally.

## New Cream Separation

One-step separation of milk that yields plastic cream with unusual keeping qualities even at room temperature is reported with use of a centrifuge recently developed by British National Institute for Research in Dairying.

Keeping quality of the 75-80 percent butterfat product is attributed to absence of solids-not-fat, which is completely removed during separation.

## "Eye" Spots Sick Wheat

New test for detecting sick wheat—by amount of light registered by a photoelectric cell—has been developed by Dr. Max Milner, Kansas State College milling department.

Research showed that the browning of sick wheat results from combining of natural proteins and sugars in the grain's germ and that as this reaction develops the fluorescence increases.

Under ultraviolet light, this fluorescence is made visible and registers on the photoelectric cell—the more recorded, the sicker the wheat. The research was supported by funds from the State of Kansas and Cargill, Inc., Minneapolis.

## Concentrated-Type Milk Again Fails to Score

Second attempt to market bottled concentrated milk in competition with whole milk in city markets seems to have suffered the fate of its predecessor.

First tried in the early 30's, the product was reintroduced with much fanfare in 1950-51. Peak sales generally occurred within the first few months. Then, as consumer interest faded, sales dropped off sharply, until today they have terminated in many cities, fallen to less than 1/10 of a percent in others.

Lack of interest in the product seems to stem from insufficient monetary savings to offset the inconvenience of mixing with water for use as whole milk.

And chances of a price reduction are slim as long as local health authorities insist that the concentrate be made from Class I milk.

Of course, it is still possible that a distributor may devise a price and sales policy that will put this product over in some market.

## Pineapple Canner Raises Production Performance

Increased efficiency through simplification of operating methods is the target of Hawaiian Pineapple Co's. recently completed $400,000 improvement program.

Major new equipment installations include a new juice extraction plant, a new empty-can central storage and distributing system, and a comprehensive conveying arrangement to deliver filled cans of product from packing tables to syruping and can-closing machines.

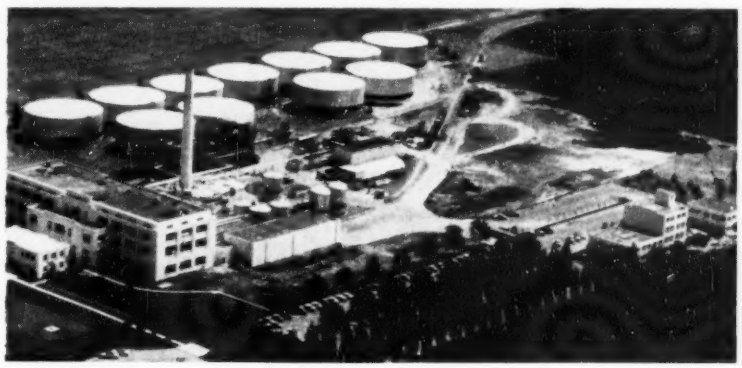
Simplification of the entire Hapco packing operation, say company officials, makes possible the new automatic movement of cans.

In the empty can system, strategically placed operators see that the lines are full and that cans are stored in reserve bins for use during later peak-demand periods. Up to 6,000,000 cans may be delivered to packing tables and stations in the course of a 24-hr. day.

### Specially Grouped Tables

New packing arrangement specially groups the tables for grading and sizing of fruit. Greatly simplifying operations, this also minimizes conveying needs.

Other recent improvements include modernizing of the preparation and distributing of the syrup. Also 16 Ginaca machines (corers) are now equipped with more efficient convertible fittings.



**Doubles MSG Capacity**

With opening of this new $1,500,000 addition, capacity for making monosodium glutamate has shot up from 4,000,000 lb. to 8,000,000 lb. annually at the San Jose, Calif., plant of International Minerals & Chemical Corp. Company states that more than 800 different packaged foods now use its flavor-boosting MSG product, trade-named Ac'cent. Raw material used in manufacture is Steffen's filtrate.

**Hot Meals for Pilots**

Use of aluminum packs now makes possible serving of hot meals to pilots and crews in flights at Wright-Patterson Air Force Base, Ohio. Here, WAF lieutenant inserts tray in electric oven. Each tray holds one complete meal, prepared as follows: Uncooked vegetables are placed in small pack, seasoned, and closely fitted aluminum top is crimped into place. Larger pack holds meat or fish portion. Heat is supplied by resistance elements secured to bottom of tray. In 30 min. meals are done, ready to serve right on tray, which keeps packs from upsetting or sliding. Foil packs are a product of Reynolds Metals Co., Richmond, Va.

## World Milk Congress Set

First of planned annual meetings to provide and explore better ways for utilization of milk throughout the world will be held in Washington Nov. 20-21.

Meeting is sponsored by Dairy Industries Society International, with Senator Wiley (Wis.) chairman.

## Prepress Solvent Mills Best for Cottonseed

Of the four major types of cottonseed oil mills—hydraulic, screw-press, direct solvent, and prepress solvent—the latter will usually return the largest profit per ton of seeds crushed. However, condition of present plant, volume of seeds available, and other factors should be considered before a change is made.

This is the conclusion reached by USDA investigators after an extensive research study.

Relative profitableness of the different processes was computed on the basis of net return to mills from products of a ton of seed. To make figures comparable, net return was calculated on the assumption that each mill was newly built and equipped. Also considered was size of operation.

## 'Lockers' Turn to Selling

Two out of every three frozen food locker plants now sell frozen foods, it is indicated in a recent survey of 1,350 such plants scattered throughout the country.

Conducted by the Farm Credit Administration of USDA, the study revealed that these purveying activities were highest in the North Atlantic region, averaging 82 percent, and lowest in the South Central area, averaging 54 percent.

Despite production, processing, and storage advances, distribution of frozen foods is still handicapped, states FCA, which accordingly finds it natural for locker plants with unused capacity to handle some distribution.

The study is covered in Misc. Report 175, *Merchandising Commercial Frozen Food by Lock Plants, 1952*, available from Farm Credit Administration, USDA, Washington 25, D.C.

## Food Sanitarians Alerted As New Roaches Arrive

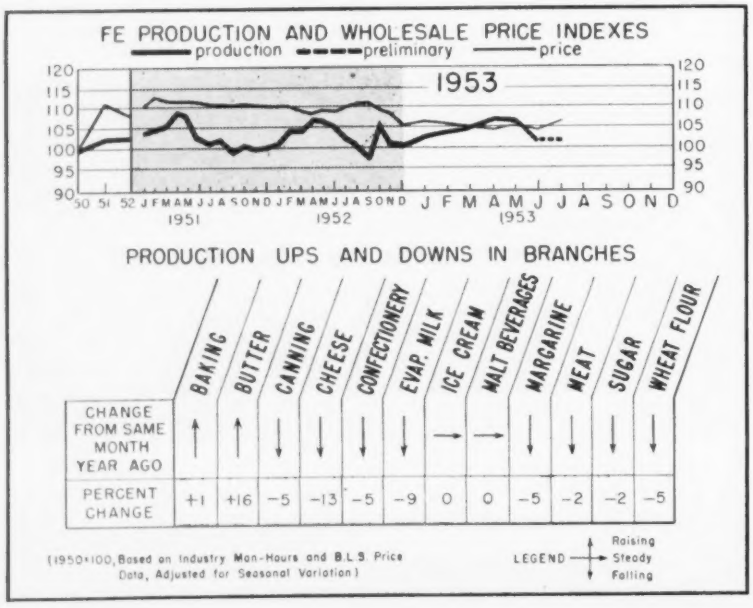
Further problem for food plant sanitarians: Three new kinds of cockroaches have come into the U. S., with at least one threatening to become a serious pest. And all are highly adaptable to both indoor and outdoor living and even colder climates.

Stated by USDA to have originated in Africa, South America, and the Mediterranean, the new species may be effectively fought with chemical insecticides, since none has yet developed resistance to such agents.

Most menacing of the three is the Madeira roach, of which there are now vast colonies in South and Central America and which, through interhemisphere commerce, has now invaded New York City, particularly the Harlem section. This roach infests fruit stores, markets, and food warehouses.

Second is the spotted Mediterranean roach, recently identified on Cape Cod. It lives outdoors but moves into houses at night. Probabilities are that it will spread over the country.

And third is the gravish East African type, already seen in Florida. Partial to warmth, it will tend to enter heated buildings in the north. These roaches have been established for more than a decade in Hawaii, where they have congregated in alarming numbers around granaries.




## How to Cut Grading Costs On Fruits, Vegetables

Substantial labor reductions in sorting fruits and vegetables for visual defects are reported through use of a new method developed in a project by the University of California and USDA.

Tests indicate that this system cuts man-hours about 75 percent in sorting lemons, 67 percent on oranges, 15 percent on potatoes. Called for is an arrangement whereby the product (1) moves toward the inspector at the right speed, (2) rotates at proper rate as it approaches, (3) is carried in a number of rows most efficient for checking.

With four rows of lemons on the belt, most efficient sorting resulted when fruit turned three times per foot of forward movement. Approach of

the fruit directly toward the sorter, rather than to one side, was found to be superior.

With oranges, optimum rotation was 1½ times per ft. of forward movement, for potatoes (three rows) 3 turns.

Full details are contained in the report, *Visual Inspection of Products for Surface Characteristics in Grading Operations*, available from the Office of Information Services, PMA, USDA, Washington 25, D. C.

### Move for Cleaner Grain

Program to improve cleanliness of wheat and reduce wheat losses through rodent, bird, and insect depredation has been put underway by a new 17-member advisory committee. Jointly announced by USDA and the U. S. Dept. of Health, Education & Welfare, the group held its first meeting last month. Chairman is Dr. Charles Glenn King, scientific director, Nutrition Foundation, New York City.

## Hors d'Oeuvres

**Spread with the steel-like German spirit, American butter has cowed Russian guns.**

Used as a catalyst for the political uprising of the oppressed, Eisenhower's "stomach bomb" (courtesy Cartoonist Low) is just about as effective an anti-Commie weapon as a General MacArthur.

**Speaking of Russians, we have just the right food for them. Skim milk—enriched with lard, fish solubles, lecithin, brewer's yeast, vitamins, and minerals—has been found to be nutritious food for pigs.**

Eighty five canners last year put up 5 million cases of dietetic foods—for those who want their bellies to bulge only at mealtime.

**Riddle: bees work a lifetime to produce 1 lb. of it, and a man works a lifetime to support 120 lb.—Could only be honey.**

Since 1945, Swift has spent $96 million to modernize its plants and equipment. The company wants its operations to live up to its name.

**In 1899, National Biscuit launched, with Uneeda, the first large-scale effort to use the consumer-size package as a basic merchandising tool. So a cracker baker sowed the supermarket seeds 54 years ago.**

According to Plutarch, the ancients' favorite breakfast was bread dipped in wine. They liked to glow at dawn.

**Indiana University's Prof. Vaclav Hlavaty finds electromagnetism to be the basis of the universe. Still, you can't eat it.**


**Another Large Firm Adopts**

**$35 NICHOLSON TRAPS AS TEMPERATURE CONTROLS**

Because they serve effectively as temperature controls as well as steam traps, and cost only about $35, Nicholson expansion steam traps are being increasingly installed in place of temperature regulators. A large processor recently installed these Nicholson units on outdoor storage tanks after thorough tests showed a less than 2°F variation in outlet condensate temperature. Regulators had been costing them $110.00 to $200.00, with cost of a trap added.

Nicholson expansion steam traps are easily adjusted to pass condensate at any temperature below 212°F. Because there is only one moving part, remarkably low maintenance costs are being shown. Easily installed, usually without supports. Lengths, 9" to 40". Press. 0 to 250 lbs. Freezeproof.

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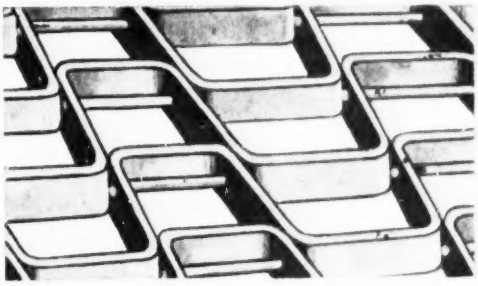
**TRAPS · VALVES · FLOATS**

*you* **SAVE**

**on every food handling operation with**

**LA PORTE FLEXIBLE STEEL CONVEYOR BELTING**



Every step of the way in food processing, packing and shipping, LA PORTE Flexible Steel Conveyor Belting is serving efficiently at lower cost. It will withstand impacts at the loading chute. It resists cold. It requires no dressing or special maintenance to keep it at peak efficiency.

La Porte Belting flexes to grip the friction drum firmly—eliminating all creeping, weaving or jumping. Thus, it provides a perfectly flat surface for containers empty or filled. The open mesh feature that permits circulation of air or liquids around products in process also simplifies sterilizing with a steam gun or scalding water. Available in any length and practically any width.

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4½" DIAL THERMOMETERS

Made in 3 types to suit any requirements. Rigid stem, wall or flush mounted, 11 inches of scale reading. Interchangeable with standard industrial separable sockets. Stem can be placed at any angle and case can be rotated to any readable position.

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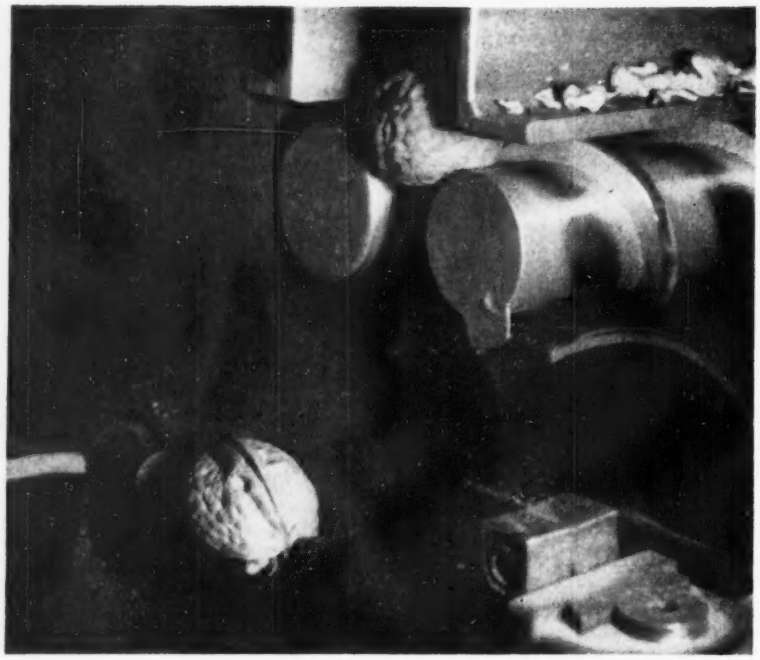

Falling from feed-screw, nut is grasped in mid-air by two electrodes, which shatter its shell with a lightning 65,000v. 5,000-amp. impulse.

## Hi-Volt Jolts Crack 'Em At 1,200 Lb. an Hour

Electric nut-crackers—18 of them—have now supplanted the conventional crusher-type crackers formerly used by Northwest Nut Growers, Portland, Ore. It is stated that improved-quality nut-meats are turned out faster by the new units.

Further, 88 hr. a week of operating time is reported saved, with the electrical equipment running five 16-hr. days as compared to the continuous schedule of seven 24-hr. days that was routine with the old crusher-type.

Operating at approximately ¼ speed, the electrics crack 1,200 lb. of nuts hourly. And due to this better performance, a crew of but 60 is now assigned to sorting and packing, whereas 100 workers were previously required.

In the new procedure, nuts are fed from storage hoppers to long helical screws, which deliver them at quick-timed intervals to the cracking electrodes. These electrodes catch each nut as it falls from the screw, and at that precise instant an electrical impulse shatters its shell.

Both nuts and shell are then conveyed to the extraction and classification departments.

Power is supplied by a 60-hp. 220v. motor generator set. Transformers step up the voltage to 65,000v. 5,000 amp., which charges 48 capacities. A spinning rotor-distributor, synchronized with the feed screws serving the 18 crackers, provides lightning-like electrical jolts from the cracking electrodes with split-second timing.

## Technical Topics Listed For Brewers' Meeting

Three major subjects—beer processing, quality control, and packaging—will be targeted in the technical program of the coming 66th Anniversary Convention of the Master Brewers Assn. of America, slated at Kiel Auditorium, St. Louis, Oct. 19-23. The meeting marks the 20th anniversary of Repeal.

Accented in each of the three sessions will be practical topical matter specifically tying in with the concurrent International Brewing Industries Exposition, which will see more than 130 firms displaying the latest equipment, materials, and services.

Listed for consideration under processing are kettle design, ultrasonic irradiation, boiling procedure, hop separation, and wort filtration. Next, the control session will highlight the challenge of modern quality control, with a panel-type followup outlining case histories.

And finally the meeting's packaging session will concern container cleaning, with special reference to liquid caustics, use of wetting agents and additives in bottle cleaning, inspection procedures, and automatic uncasers.

## Columbia Opening Course On Package Engineering

A comprehensive course on package engineering will be launched Sept. 30 by Columbia University's School of Engineering, New York City. It will continue each Wednesday evening until Jan. 20.

Principle objective of the course is to attract and develop technical men as packaging engineers.

The course is open to the public as well as students earning credits for degrees. It will appeal to packaging engineers, executives of manufacturing plants, distributors, and certain advertising concerns.

Scheduled are 21 lectures to be given by authorities in the field. Included will be consultants, an engineer and a technologist from the food industry, representatives of makers of packaging machines and materials, and a speaker associated with the Armed Forces.

Following is a brief of subject matter: Glass containers, plastic films, foils, barrier materials, metal and composite cans, fiber cans, grocery and variety bags, specialty bags, folding and set-up boxes, rigid and semi-rigid plastic containers, glassine and parchment papers, closures, and nested food containers. Among considerations of bulk packaging materials will be included corrugated and solid fiber boxes, wooden boxes, open crates, pallets, wire-bound boxes, and crates, multiwall paper shipping sacks, textile and industrial bags, cylindrical shipping containers, adhesives, tapes, and materials for stitching, stapling, steel strapping, and wire tying.

## Food Firm Private Borrowing Down $16 Million

Financial operations by food plants in 1952 saw private-placement funds totaling $87,980,000 obtained by 31 manufacturers. Sources of the money were life insurance companies and other types of long-term investing institutions.

This borrowing, detailed in *The 1953 Yearbook of Private Placement Financing*, recently published by E. V. Hale & Co., Chicago, ran about $16 million less than in 1951, when 49 food companies obtained $103,923,000.

Total private placement financing in '52 amounted to $5,032,803,000, as compared with $5,085,238,000 the year before, the *Yearbook* states, with 1,124 issues in '52 as against 1,256 in '51. Industrial corporations accounted for $3,249,588,000, or 65 percent of the total, as compared with $3,564,000,000, or 70 percent in 1951.

Largest individual loan was an issue of $16,500,000 4.25-percent first mortgage bonds, due 1968, placed for Clinton Foods, Inc., with a life insurance company. General Mills also placed a $15,000,000 3.50-percent 20-yr. note with a single institution.

Milling concerns received the largest total—$28,870,000—divided among 11 companies. In addition to the General Milling loan, millers getting funds through private-placement loans included Lauhoff Grain Co., $4,950,000; Centennial Flouring Mills, $2,500,000; Wonder Rice Mills, $2,400,000; H. K. Webster Co., $1,000,000; Doughboy Industries, Inc., $660,000; Pillsbury Grain Elevator Corp., $600,000; Birdsey Flour Mills, $500,000; Beacon Milling Co., $250,000; and Pillsbury Mills, Inc., $100,000. Wonder Rice Mills also placed $1,000,000 6.00-percent preferred stock with an investing institution.

Largest total among food field classifications went to packaged foods, with eight companies receiving $28,850,000. Clinton Foods, Inc., is included in this classification. Other private-placement borrowers included Hills Bros. Coffee, Inc., $6,000,000; Mrs. Tucker's Foods, $2,000,000; John Sexton Co., $1,750,000; Tetley Co., $800,000; Gordon Foods, Inc., $750,000; Exchange Lemon Products, $750,000; and Nicola-Dancey, Inc., $300,000.

Four makers of dairy products got loans totaling $11,210,000. The largest, an issue of $6,000,000 4.00-percent 15-yr. notes, was placed with a life insurance company for Arden Farms Co. Foremost Dairies, Inc., sold $5,000,000 4.00-percent 15-yr. notes to an institution, and Middletown Milk & Cream Co. and Verifine Dairy Products Co. obtained $90,000 and $120,000, respectively, from institutional investors.

In the meat packing field, British Columbia Packers, Ltd., obtained $6,000,000 through placement of 5.00-percent 15-yr. first mortgage bonds, and Rath Packing Co. placed $3,500,000 3.50-percent 25-yr. notes with a group of institutions. Four baking companies got $6,300,000, largest loan being a $3,750,000 4.50-percent 15-yr. note placed with a life insurance company for Langendorf-United Bakeries, Inc. Interstate Bakeries Corp. borrowed $1,000,000; Maryland Baking Co. $1,250,000; and Williams Baking Co., Inc., $300,000. Not classified above were loans of $2,500,000 to J. R. Simplot Co. and $750,000 to Pepperidge Farm, Inc.


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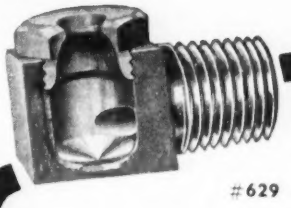

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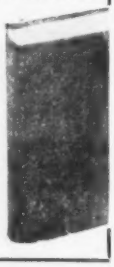

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## Schedule of Events

September

15—American Assn. of Candy Technologists, Sanitation Seminar; Penn-Sheraton Hotel, Philadelphia.

16-18—Dairy Products Institute; University of Minnesota, St. Paul campus.

October

1-2—American Butter Institute, annual meeting; Hotel Morrison, Chicago.

2-4—National Poultry, Butter & Egg Assn.; Chicago.

2-6—American Meat Institute, annual meeting; Palmer House, Chicago.

10-17—International Dairy Show (Chicago Farmers Club); International Amphitheater, Chicago.

11-13—Brewers' Assn. of America, annual convention & exhibit; Edgewater Beach Hotel, Chicago.

12-14—Packaging Institute, annual forum; Hotel Statler, New York City.

18-20—National Pretzel Bakers Institute; Claridge Hotel, Atlantic City, N. J.

19-23—Master Brewers Assn. of America, annual convention, and International Brewing Industries Exposition; Kiel Auditorium, St. Louis, Mo.

20-22—Industrial Packaging & Material Handling Exhibition; Boston.

24-28—American Bakers Assn., annual meeting, Hotel Sherman, Chicago.

26-27—National Pickle Packers Assn., annual meeting; Drake Hotel, Chicago.

26-28—Milk Industry Foundation, convention; Sheraton Plaza Hotel, Boston.

28-30—International Assn. of Ice Cream Manufacturers, annual convention; Statler Hotel, Boston.

## Ike Signs Inspection Bill

Restoration of FDA's authority to inspect food plants, without warrants or owners' permission, was approved by President Eisenhower at the close of Congress, becoming Public Law 217. The bill was signed in the form in which it passed the House and in which the Senate then concurred (FE Aug., p. 184).

## FDA Food Standards

*Cacao products*, standards of identity, have been scheduled for a public hearing on Sept. 15. The Secretary of Health, Education & Welfare has taken the initiative in proposing an amendment to repeal the provisions of those standards that make coumarin an optional ingredient. Leonard D. Hardy has been designated presiding officer in the notice, which appeared on page 4606 of the Aug. 5 *Federal Register*.

*Ice cream* briefs (including frozen custards and sherbets) were acceptable until Aug. 31, an extension from the Aug. 3 deadline previously set. This notice appeared on page 4527 of the Aug. 1 *Federal Register*. The hearing closed on Dec. 31, but with this second extension of time for filing briefs it is unlikely that the tentative order will be issued before winter.


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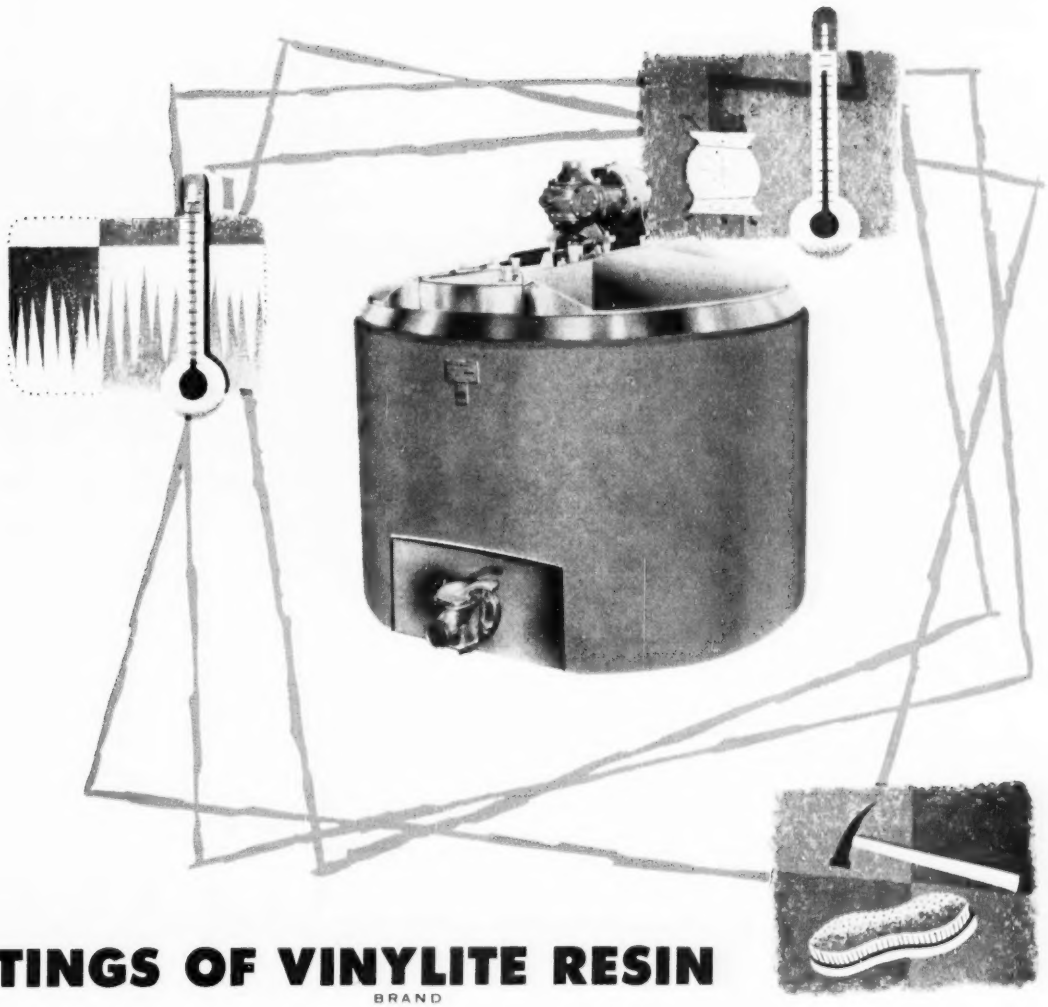

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# Recent Inventions

## PRODUCTS

Stabilized Food Product Composed of Mixture of Gelatinous Meat Stock, Shelled Roasted Peanuts, Pimentos and Tomatoes Cooked Together Until Peanuts Swell and Tenderize—*J. Grader, Washington, D. C. No. 2,640,781. June 2, 1953.*

Soft, Surface-Cured, Mold-Ripened Cheese Encased in Mold Pad With Porous Fabric Separator Between Pad and Interior—*J. H. Kraft, Chicago, to Kraft Foods Co. No. 2,641,545. June 9, 1953.*

Flavoring Composition Containing Fat and Gelatinized Starch Flakes of Definite Particle Size, Fat Being Present at 2 to 9 Parts of Starch—*J. W. Evans, Highland, Ind. to General Mills, Inc., Minneapolis, Minn. No. 2,641,547. June 9, 1953.*

Dried Milk Product for Use in Coffee Made by Adding Substances From Disodium Phosphate Group Followed by Substantial Heat Treatment—*C. A. Kempf, Berkeley, Calif. and E. L. Blanchard, Washington, D. C. to Golden State Co., Ltd., San Francisco. No. 2,645,579. July 14, 1953.*

Solid, Fluffy Chocolate Confection Made by Dispersing Nitrous Oxide Under Pressure in Molton Confection, Releasing Pressure to Fluff, Cool and Harden—*P. E. Schultz, Wichita, Kan. No. 2,645,580. July 14, 1953.*

Composition for Salting and Stabilizing Fatty Foods Against Rancidity by Coating Common Salt Crystals with Glyceryl Monostearate Containing Nordihydroguaiaretic Acid and Synergist—*C. S. Robinson, to Morton Salt Co., Chicago. No. 2,645,581. July 14, 1953.*

## PROCESSES

Conditioning Beer Storage Tanks or Other Beer Containers With Carbon Dioxide Gas by Employing Dry Ice to Evaporate and Drive Out Air—*G. L. N. Meyer, Milwaukee to Geo. J. Meyer Mfg. Co., Cudahy, Wis. No. 2,639,849. May 26, 1953.*

Canning Process for Low-Acid Foods Employing High-Short Heat Sterilization and Filling of Containers in Superatmospheric Pressure Environ to Preclude Boiling, Applying Sterilized Cover Loosely, Then Permanently Securing Lid at Lowered External Pressure—*C. Olin Ball, New Brunswick, N. J. No. 2,639,991. May 26, 1953.*

Cleaning Chocolate Molds by Jetting Dry Steam in Confined Space While Simultaneously Removing Steam and Impurities by Suction—*A. C. Steenberg, Copenhagen, Denmark. No. 2,640,003. May 26, 1953.*

Dressing Cattle on Continuously Moving Conveyor by Sequenced Suspension From Each Rear Leg to Remove Feet and Open Butt, Then Suspension by Both Hind Legs to Open Brisket, Turn Shanks, Clean Neck, Remove Hide and Eviscerate While Carcass is in Motion—*L. T. Force and G. Moore, Norwood, Manitoba, and W. J. Hincks, to Canada Packers Ltd., St. Boniface, Manitoba Canada. No. 2,640,225. June 2 1953.*

Freezing Relatively Large Foodstuffs by Contacting With Small Chilled Solids Which Are Continuously Refrigerated—*B. E. Bailey, Elizabeth, N. J. No. 2,640,333. June 2, 1953.*

Reducing Sandiness in Ice Cream and Ice Milks By Adding and Mixing to Mix Prior to Freezing and After Pasteurization a Small Amount of Lactose Crystals in Discrete Form—*C. W. Decker, Pullman, Wash. No. 2,641,546. June 9, 1953.*

Method of Charging Liquid Products Into Pressure Containers by Partially Evacuating, Introducing Measured Liquid Charge Through Valve-Controlled Opening and at Same Time Adding Measured Charge of Liquid Propellant—*D. M. McBean, Rochester, N. Y. to Carter Products, Inc., N. Y. No. 2,641,399. June 9, 1953.*

Flavor Coating Meat Patties By Drawing Juices to Surface, Impregnating Them With Aromatic Flavoring Material, Cooling Immediately—*L. C. Parker, Elmira, N. Y. No. 2,641,544. June 9, 1953.*

Preserving Avacado Meat by Blanching in Edible Vegetable Oil for 1-min. at 185–220 deg. F.—*H. W. Heinrich, Little Rock, Calif. No. 2,641,548. June 9, 1953.*

Treating Supersaturated Sweetened Condensed Milk to Remove Normal Large Crystal Formation by Seeding With Lactose Crystals of Special Size—*R. de Vletter, to N. V. Lijempf, Leeuwarden, Netherlands. No. 2,641,549. June 9, 1953.*

Obtaining Concentrated Volatile Flavors By Vaporizing, Condensing, Removing Bulk of Water, Condensing Heavier Volatiles at 32 to −91 deg. F., and More Volatile Fresh-Like Constituents at Below −130 deg. F.—*K. G.*

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*Dykstra, Albion, N. Y. and D. De Felice, Morristown, N. J.* No. 2,641,550. June 9, 1953.

## EQUIPMENT

Weighing Machine for Flowable Solid Material Employing Pneumatically Operated End-Weight Cutoff—*M. Knobel, Arlington, to* Pneumatic Scale Corp., Ltd., Quincy, Mass. No. 2,634,080. No. 2,634,081-82. April 7, 1953.

Weighing Apparatus for Loading Free Flowing Material Employing Photo-electric Cells to Actuate Dribble Feed and Shut Off Position—*H. D. McWaters, Pampa, Tex. to Godfrey L. Cabot, Inc., Boston, Mass.* No. 2,634,084. April 7, 1953.

Dough Measuring Machine Employing Sliding Valve Entry Piston Chamber For Ejecting Dough Supplied From Hopper Under Suction Pressure—*W. de Ridder, The Hague, Netherlands.* No. 2,638,066. May 12, 1953.

Container Filling Machine Employing Revolving Carriage With Means for Plurality of Different Fluids to Enter Sections of Filling Head—*R. W. Garrett, Scarsdale, N. Y. to* Garrett & Co., Inc., *Brooklyn.* No. 2,638,259. May 12, 1953.

Weight Proportioning Means and Method Employing Separate Weighing Stations for Plurality of Dry Ingredients Onto Intermittent Weigher-Actuated Moving Belt—*R. L. Miller, Berkeley, Calif.* No. 2,638,305. May 12, 1953.

Apparatus for Treating Chocolate or Like Comprising Jacketed Vessel Employing Scraping Stirrer With Supplemental Stirring Members and Hinged Scraping Blades—*W. G. Weygand, East Meadow, and J. Swendsen, Lynbrook, N. Y. to* Wegner Machinery Corp., *Long Island City, N. Y.* No. 2,638,329. May 12, 1953.

Adjustable Means for Rolls of Multiroll Chocolate Refining Machines—*A. A. Tunley, Peterborough, England to* Baker Perkins Ltd., *Peterborough, England.* No. 2,638,388. May 12, 1953.

Apparatus for Forming Stuffing Casings and Links Therefrom Comprising Pair of Parallel Extrusion Nozzles With Annular Rotatable Member For Twisting Stuffed Casings Into Links—*W. Wade, Philadelphia, Pa. to* American Viscose Corp., *Wilmington, Del.* No. 2,638,624. May 19, 1953.

Apparatus for Cooling and Conditioning Baked Products Continuously by Moving in Plurality Through Tempering Zone, Then Treating in Vacuum Zone to Progressively Lowered Vacuum—*M. H. Duval, Westport, Conn.* No. 2,638,685. May 19, 1953.

Pressure Cooker for Heating Granular Material Continuously Employing Tank With Baffled Steam Jets—*P. Talmey and R. W. Landon, to* General American Transportation Corp., *Chicago.* No. 2,638,837. May 19, 1953.

Sandwich Machine for Coating Fragile Baked Goods With Sticky Materials—*H. P. Curlee, Raleigh, N. C. to* Curlee Machinery Co., Inc., *of N. C.* No. 2,638,868. May 19, 1953.

Mushroom Trimming Device Employing Plurality of Product Retaining Disks and Integrated Knife Blades to Sever Cap, Stem, and Root—*W. G. Blevins, Sr., and R. A. Coleman, West Chester, and J. Mills, Drexel Hill, Pa. to* Brandywine Mushroom Corp., *West Chester.* No. 2,638,949. May 19, 1953.

Apparatus for Transferring Uncooked Bakery Articles Such as Doughnuts From Trays to Driven Endless Carrier—*J. Kinzelman, Northbrook, and F. A. Anetsberger, Chicago, to* Anetsberger Bros., Inc., *Northbrook, Ill.* No. 2,639,049. May 19, 1953.

Egg Cleaning Machine Employing Tensioning Belt With Brush Backing Member—*C. Aspinall, Burlington, Wis.* No. 2,639,561. May 26, 1953.

Pneumatic Conveying System for Flour Stocks Employing Air Activation, Vertical Conduit With Means for Throttling Air Current—*G. Watts, to Henry Simon, Ltd., Cheadle Heath, Stockport, England.* No. 2,639,862. May 26, 1953.

Apparatus for Processing Fluent Foods Comprising Tank With Rotating Agitator and Radial Extending Blades Having Warped Grooved Surfaces—*G. T. Reich, Philadelphia, Pa.* No. 2,639,898. May 26, 1953.

## PACKAGING

Machine for Setting Up Knocked-Down Paperboard Cartons—*R. J. Fahey, Evanston, to* Shellmar Products Corp., *Chicago.* No. 2,639,648. May 26, 1953.

Mechanized Egg Carton Positioner for Belt Loading—*R. C. Sneed, Piedmont, and C. S. Jordan, Maywood, Calif. to* Safeway Stores, Inc., *Oakland, Calif.* No. 2,639,801. May 26, 1953.

Tin Can Stacking Machine Employing Inclined Stacking Wall With Feeder Chute and Discharging Elevator—*H. W. Madden, Hanover, Ind.* No. 2,639,823. May 26, 1953.

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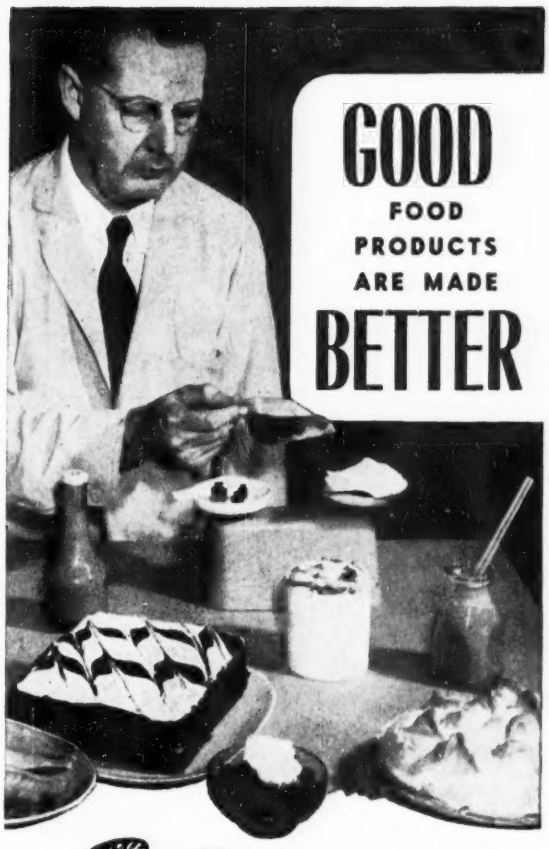

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- Bodying
- Emulsifying
- Gelling
- Modifying
- Stabilizing
- Suspending
- Thickening
- Custardizing milk and products containing milk solids
- Improving mouth feel and flavor
- Increasing efficiency of component ingredients
- Modifying ice crystal growth
- Physical and anti-oxidant protection

* SeaKem is the registered trademark for the standardized, water-soluble, sea plant extractives manufactured by the Seaplant Chemical Corporation. Refined by rigidly controlled processes which insure dependable uniformity and purity, SeaKem "Colloids Out of the Sea" are light amber to colorless, free-flowing flaky powders. Available in a variety of types suitable for use in either dry or liquid applications, SeaKem Stabilizers have won acceptance on the basis of proven advantages with leading food manufacturers and processors.

**Send for latest SeaKem Technical Bulletins**

SEAPLANT CHEMICAL CORPORATION
63 David St., New Bedford, Massachusetts

PROVED IN OVER 1700 INSTALLATIONS!

*Production soars with "JET" handling of condensate with a*

**cochrane C-B**
**CONDENSATE DRAINAGE SYSTEM**

Over 1700 installations in every kind of steam process work, prove that the Cochrane "JET" principle of condensate drainage steps up production, cuts fuel costs and improves quality.

**Up to 35% increase in production has been achieved.** The Cochrane "JET" unit removes "insulating" layers of condensate from all types of steam processing equipment continuously and effectively. It produces faster, more efficient heat transfer; eliminates cold starts; speeds cooking, drying and curing cycles.

**Improved product quality.** The Cochrane "JET" unit levels out heat fluctuations—maintains uniform intense heat transfer, producing better quality product in less time.

**Lower fuel and maintenance costs.** The Cochrane C-B system chops fuel costs by 10% or more returning condensate to the boiler or "make-up" system without appreciable pressure or temperature drop—cuts make-up water requirements—eliminates flashing—reduces boiler room maintenance, automatically separates entrained air and corrosive gasses from returned condensate.

**Write today** for full information on how a Cochrane C-B High Pressure Condensate Drainage Control System can help you when used with . . .

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| Platen Presses | Vulcanizers | Tumblers |
| Jacketed Kettles | Tube Dryers | Coil Cookers |
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| Expellers | Dry Plates | Spray Dryers |
| Drying Rolls | Unit Heaters | Presses |
| Coil Dryers | Jacketed Mixers | Digesters |
| Stills | Paper Machines | Heating Systems |

**cochrane**
**corporation**
*3173 N. 17th Street, Philadelphia 32, Pa.*

# Men & Companies

**Henry J. Muessen** has been elected president and chairman of the board of Piel Bros. He succeeds the late **William Piel.**

## Industry

**American Institute of Baking's** new member is **National Council of the Baking Industry of Canada.**

**Carnation Co.** will begin construction of a $150,000 annex to its headquarters buildings in Los Angeles.

**Beech-Nut Packing Co.** will enlarge its baby food production facilities at Canajoharie, N. Y.

**Borden Food Products Co.** has moved its fourteen state central division from New York to Detroit.

**Burlington Brewing Co.,** Burlington, Wis., has named Maurice B. Frank as president and Joseph Deubig as vice-president.

**Carlson-Frink Co.** will construct a $500,000 plant in Denver to house company's laboratory, pasteurizing, homogenizing and packaging departments.

**Christie Brown & Co., Ltd.,** Winnipeg, Man., biscuit makers will build a $2,000,000 addition to its plant.

**Dole Hawaiian Pineapple Co.** has completed a $400,000 modernization program at its Hawaiian plant.

**Fleischmann Laboratories,** research and development unit of Standard Brands, Inc., will move from New York City to Stamford, Conn.

**Foremost Dairies, Inc.** has merged with **Marin Dairymen's Milk Co., Ltd.,** and **Dairmaid Creameries, Ltd.,** both of California.

**General Bakeries Ltd.** will construct a new Toronto plant.

**General Baking Co.** has broken ground at Spartanburg, N. C., for a new $1,600,000 bakery.

**General Foods Corp.** will soon consolidate all foreign activities under an international headquarters in New York City.

**George A. Hormel & Co.,** Austin, Minn., has purchased Fort Dodge, Ia., pork packing and processing plant of **Tobin Packing Co.**

**Kingan & Co.,** Indianapolis meat packers, has announced a $350,000 expansion program.

**Libby, McNeil & Libby** has named W. B. Traynor as chairman and C. S. Bridges as president.

**Maxwell House Div. of General Food Corp.** plans expansion of its Jacksonville, Fla., plant.

**Minute Maid Corp.** will expand its Plymouth, Fla., plant by 10-15 percent at an estimated cost of $750,000.

**Morton Salt Co.** has begun construction of a new research laboratory at Woodstock, Ill.

**Mrs. Tuckers Foods** has opened its multi-million dollar plant at Jacksonville, Ill.

**Sicks Seattle Brewing & Malting Co., Seattle,** and **Hamm Brewing Co.,** St. Paul, have formed a syndicate to purchase **Rainier Brewing Co.** of California in a $2,500,000 transaction.

**Standard Brands, Inc.,** has leased a 12 acre site in New Orleans for construction of a coffee processing plant.

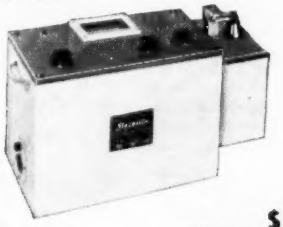
**Donald E. Mook** is Borden Co.'s new products research laboratory director. With the laboratory since 1941, he was formerly assistant director.

IF YOU PACK CORN

USE THE

# STEINLITE 300
## maturity tester

The fastest, surest, lowest cost way to improve uniformity and quality of pack. Increase your profits this year with more EXTRA FANCY corn selected by testing moisture with a Steinlite 300 LSC.



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IF YOU CAN OR FREEZE OTHER VEGETABLE AND MEAT PRODUCTS WRITE FOR INFORMATION. Learn how the Steinlite 300 LSC can help you control uniformity, increase quality and yield of your pack. **Write today for complete facts. No obligation, of course.**

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EQUIPMENT CO.

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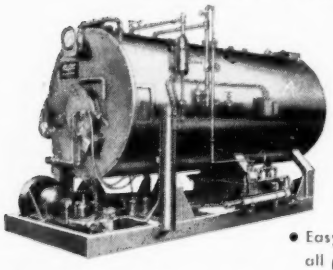
"Easy to install... Easy to operate... Easy on the fuel!"

AMESTEAM GENERATOR



- A complete unit, piped and wired, ready for service connections.
- Needs no special foundation or expensive stack.
- Fully automatic... attention-free.
- 80% efficiency means real fuel savings.
- Easy to clean and service... all parts accessible.

20 SIZES — 10 to 600 h.p. — 15 to 200# OIL OR GAS

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THE ERIEZ PERMANENT NON-ELECTRIC

# GRATE MAGNET

BRINGS You "TRAMP IRON PROTECTION"

*Never Before Possible!*

The rugged ERIEZ Grate Magnet removes tramp iron from free flowing materials when installed in hoppers, floor openings, vertical closed chutes, etc.

ERIEZ Grate Magnets are available in 162 sizes, from 2½"x4" to 36½"x36". Here's protection to valuable equipment and a great help in preventing product contamination. Stops fires and explosions . . . *tramp iron can't get by!*

### *Look At These Features...*

- Cadmium plated, hot rolled steel grill protects the magnets, slows and directs material stream onto all of the powerful magnetic tubes.
- Fast and easily cleaned . grill lifts off for easy access to smooth magnetic tubes.
- All sizes can be furnished entirely of stainless steel.
- Installation is fast and simple . . . no cutting or bolting necessary.

*and a Companion*

NEW . . . LOW COST . . . PERMANENT

## HOPPER MAGNET

ADAPTABLE FOR INSTANT INSTALLATION IN MOST ANY SIZE SLOPE-SHAPED HOPPER!

The new ERIEZ Hopper Magnet affords needed protection never before available! Circle design of the unit makes it the simplest of all magnetic installations . . . merely lay it in the throat of any hopper, and while in this position it will grab and hold tramp iron from the free flowing material which passes through it! Constructed in 1" increments, the units can be had in any width.

•

*Send for free bulletin B-204 fully describing these two new magnetic products.*

ERIEZ MANUFACTURING COMPANY

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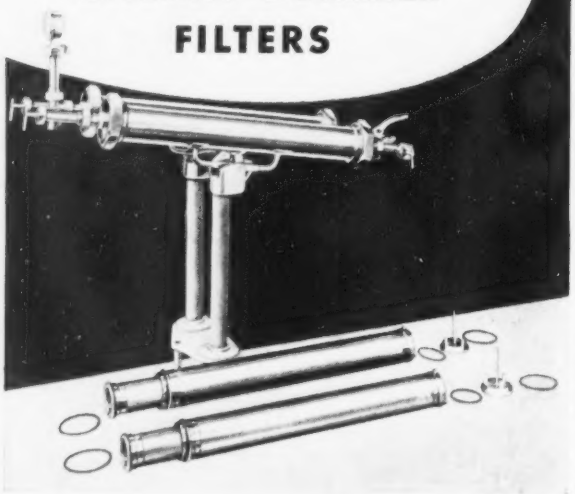
*If Liquids Flow* ***AT ALL***

*They'll Flow Clean Through*

**CHERRY-BURRELL FILTERS**



***"PCF" Pressure Filters:*** Pressure tight tubes, two stainless steel screens with *circular* holes positively screen out sediment. No product by-passing. No copper to copper surfaces to give product oxidized flavor. Easy to take apart and clean. Operate in vertical, inclined or horizontal positions.

Three models Cherry-Burrell "PCF" single and double tube filters. Capacities to 20,000 lbs. per hr. depending on product and type screen used.

No. 3 Filter
2000 lbs. per hr.

***Standard Pipe Line Filters:*** Designed for capacities up to 2000 lbs. per hr. Cherry-Burrell Nos. 1½ and 3 Filters fit any standard pipe line—operate either horizontally or vertically. Easy to dismantle. Stainless steel outer body and perforated filter screen; cotton filter bags fit snugly over filter screens. May be used without cloths.

***Vertical Floor-Mounted Filter:*** Capacities to 12,000 lbs. per hr. Designed for high-capacity filtering or straining. Several grades of cloth available. Filters can be provided with either a coarse screen supporting filter cloth or with coarse and fine screens for two-stage straining.

No. 12 Filter
12,000 lbs. per hr.

*Ask your Cherry-Burrell Representative for complete details about these filters. Or write:*

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*Equipment and Supplies for Industrial and Food Processing*

FACTORIES, WAREHOUSES, BRANCHES, OFFICES
OR DISTRIBUTORS AT YOUR SERVICE IN 36 CITIES

**Dr. Robert C. Hockett,** former scientific director of Sugar Research Foundation, Inc., has joined Arthur D. Little, Inc., food plant consultants. He is noted for his research in nutrition and food technology.

**Stark, Wetzel & Co.,** Indianapolis meat packer, has purchased Armour & Co.'s Indianapolis plant for $500,000.

**Welch's Candy, Ltd.,** Los Angeles, has been purchased by J. W. Robinson Co.

**William Wrigley Co.** plans construction of a $2,000,000 plant at Santa Cruz, Calif., in the future.

**Ziegler Candy Co.,** Milwaukee, has purchased **Bonita Candies** of Fond du Lac, Wis.

## Personnel

**Arlee A. Andre** is new vice-president of Nebraska Consolidated Mills Co.

**Howard C. Boerner** is newly elected director of Heeney Frosted Foods, Ltd., Montreal.

**Charles S. Bridges** is new president of Libby, McNeill & Libby.

**Robert C. Davenport** has been named technical director of Diamond Crystal Salt Co.

**W. J. Douglas, Jr.,** has been named Georgia branch manager for Kraft Foods Co.

**Dr. Mary Louis Elder,** an associate chemist with Canadian Canners, Ltd., Ontario, has been awarded Fellowship in the Chemical Institute of Canada.

**F. V. Hamilton** is newly elected vice-president of Pfeiffer Brewing Co., Detroit.

**Willem Lasthuysen** has joined flavor department of Dodge & Olcott, Inc. as a chemist.

**George P. Meade,** manager of Colonial Sugar Co.'s refinery at Gramercy, La., and a director of Cuban-American Sugar Co. has been named "man of the year" by American Chemical Society's Carbohydrate Div.

**Leon A. Miller** is new president and general manager of General Foods, Ltd., Toronto.

**Robert C. Moberly** has been named administrative assistant to the president of Piel Bros.

**Wiley S. Obenshain, Jr.,** manager of Southern Dairies, Inc.'s Georgia zone, has been elected president of Georgia Dairy Assn.

**C. R. Pritchard** is new manager of Swift & Co.'s North Portland, Ore., plant.

**Stanley Powell,** vice president of California Packing Corp., San Francisco, has been appointed to an advisory committee of Senate Committee on Banking and Currency.

**R. L. Woodward** has been elected vice president and sales manager of Holly Sugar Corp., Colorado Springs, Colo.

**L. W. Mineau** has been appointed acting manager of Libby McNeill & Libby's Frozen Food Division.

**Donald H. Race** has been named field director of Dairy Products Improvement Institute.

**L. Eric Reford** is new president of Mount Rice Mills Ltd.

**Carl R. Robbins,** former president of General Plywood Corp., has been appointed executive vice-president and general manager of Frank Fehr Brewing Co.

**R. Curtis Turner** has been elected a vice-president of California Packing Corp., and will continue as manager of company's pineapple interests.

**E. A. Wergin** is new manager of Fairmont Foods Co.'s Rapid City, S. D., branch.

**Glenn Whittaker,** general manager of Ohio Cloverleaf Dairy, has been elected president of the Toledo firm.

**Dr. M. C. Brockman,** formerly senior scientist, has been advanced to director of research of Kingan & Co. He has been with Kingan's research staff since 1951.

**Edward M. Muldoon** has been appointed general manager of La Choy Food Products, a division of Beatrice Food Co., Archbold, O.

**T. J. Nelson** is recently appointed assistant to byproducts project coordinator of Hawaiian Sugar Planters Assn.

**George D. Wilson** will head American Meat Institute Foundation's newly created division of food technology.

**Harry D. Wilson** is new vice-president of board member of Borden Co.'s chemical division.

## Associated Industry

**American Can Co.** is installing a fiber milk container manufacturing unit at its Stockton, Calif., plant.

**Beckman Instruments, Inc.,** has appointed Henry J. Noebels to head its applications engineering division.

**Chain Belt Co.** of Milwaukee has named J. C. Merwin as board chairman and L. B. McKnight as president and chief executive officer.

**Cherry-Burrell Corp.** recently named Brooks Jakeman as manager of its Boston branch.

**Continental Can Co.** is constructing a $33,000,000 warehouse in Vernon, Calif.

**Frigidaire Div.,** General Motors Corp., has named J. L. Gibson as chief engineer.

**Insect Control & Research, Inc.,** consulting entomologists and sanitary engineers, have opened offices in Philadelphia.

**Milprint, Inc.'s** newest affiliate is Milprint de Mexico, located in Monterrey, Mexico.

**Oakite Products, Inc.,** has appointed J. J. Basch manager of research and product development.

**Owens-Corning Fiberglas Corp.** has appointed Henry R. Hogendobler vice-president and general manager of its supply and contracting company.

**Carpenter Steel Co.'s** Alloy tube division has appointed P. L. Coddington as assistant to the president.

**Paterson Parchment Paper Co.,** Bristol, Pa., has announced appointment of John W. Greve as manager of its waxed paper division.

**Pollock Paper Corp.** has appointed W. A. Rike as director of Package Design and Ted Jensen as bakery service director.

**Raybestos-Manhattan, Inc.'s** new executive vice-president is J. H. Mathews.

**Robert Gair Co.'s** new assistant to vice-president in charge of boxboard operations is William H. Cadoo.

**Worthington Corp.** has named Matthew Lawler to head air-conditioning division.

## Deaths

**Fritz W. Baldenhofer,** 76, owner of Blue Seal Bottling Works, New Orleans—August 8.

**Emanuel Blosser,** 76, a founder and president of City Produce Exchange, Harrisburg, Va.—August 23.

**John Burns,** 68, president of Burns & Co. Ltd., Canadian meat packers.—June 24.

**H. M. Chapin,** 48, former general manager of Birds Eye Div. of General Foods Corp.—Aug. 13.

**Daniel W. Creeden,** 61, president of Libby, McNeill & Libby.—July 26.

**George H. Ellis,** 86, canning industry pioneer.—Aug. 20.

**Henry W. Jeffers, Sr.,** 82, president of Walker-Gordon Laboratory Co. and well known dairy expert.—July 17.

**Nathan B. Swift,** 41, vice-president of Swift & Co.—July 31.

**Marcus C. Weimar,** 73, former vice president of Armour & Co.—August 1.

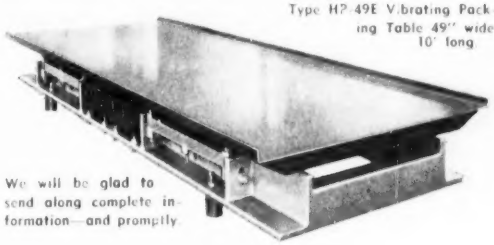
Low head Barrel Packer

# VIBRATING PACKERS

Jeffrey electric vibrating Packers provide real economy in packing operations.

**Reduce size of containers. Increase their capacity Cut shipping costs**

As shown, Jeffrey Packers can be supplied with various diameters of platen head to take barrels, cartons, etc., or with vibrating deck to provide conveying action during the packing operation. They are well built and sturdy—will give years of satisfactory service.



Type HP-49E Vibrating Packing Table 49" wide, 10' long

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Columbus 16, Ohio

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# SPRAY NOZZLES

## ...FOR LOWER COST

CLIP AND MAIL

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# *Just Off the Press*

**New Catalogs and Bulletins from manufacturers of equipment and supplies —Free For The Asking—**

## Food Plant Equipment

### Gear-Motors

Function, design, and application of gear-motors are described in booklet. 16 pages.—*General Electric, Schenectady 5, N. Y.*

Circle 228A on Reader Service Card

### Non-Metallic Disk Valves

Colorful leaflet presents dimensions and functions of non-metallic disk valves. 4 pages.—*Lunkenheimer Co., Box 360-U, Cincinnati 14.*

Circle 228B on Reader Service Card

### Dairy Equipment

Complete line of standardizers, clarifiers and separators is covered in bulletin.—*Sharples Corp., Dairy Equipment Div., 2300 Westmoreland St., Philadelphia 40.*

Circle 228C on Reader Service Card

### Pulverizer Mill

Brochure deals with principle of pulverizing by air attrition and impact, with simultaneous internal classification and recycle of oversize in a single machine. 4 pages.—*Schutz-O'Neill Co., 319 Portland Ave., Minneapolis 15.*

Circle 228D on Reader Service Card

### Welded Floats

Stainless steel, monel and chrome, cadmium or copper plated steel welded floats are subject of Bulletin 753. 8 pages.—*W. H. Nicholson & Co., 12 Oregon St., Wilkes-Barre, Pa.*

Circle 228E on Reader Service Card

### Standard Motors

Bulletin treats with features of standard electric motors. 4 pages.—*Wagner Electric Corp., 6400 Plymouth Ave., St. Louis 14.*

Circle 228F on Reader Service Card

### Process Equipment

Equipment for the process industries ranging from dryers to liquid storage terminals is dealt with in catalog. 24 pages.—*General American Transportation Corp., 135 S. LaSalle St., Chicago 90.*

Circle 228G on Reader Service Card

### Automatic Wrapper

Featuring continuous feed and high speed, automatic wrapper is subject of leaflet. 4 pages.—*Hudson-Sharp Machine Co., Green Bay, Wis.*

Circle 228H on Reader Service Card

### Electrical Valves

Leaflet covers advantages of electrically operated high pressure valves. 4 pages.—*Atkomatic Valve Co., 545 W. Abbott St., Indianapolis.*

Circle 228I on Reader Service Card

### Industrial Filtration

Continuous, full-flow, self-cleaning and fully automatic filtration is discussed in booklet. 8 pages.—*Industrial Filtration Co., Lebanon, Ind.*

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### Oil Valves

Straight line precision control of flow to oil burners with use of self-cleaning oil valves is featured in Catalog 707A. 4 pages.—*Hauck Mfg. Co., 124-136 Tenth St., Brooklyn 15.*

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### Freeze-Drying

Catalog 740 describes use of freeze-drying as a method of preserving food. 16 pages.—*F. J. Stokes Machine Co., 5500 Tabor Rd., Philadelphia 20.*

Circle 228L on Reader Service Card

### Oil Burning Systems

Bulletin illustrates series of complete combustion systems. 4 pages.—*Peabody Engineering Corp., 580 Fifth Ave., New York 36.*

Circle 228M on Reader Service Card

### Chlorine Dispenser

Specifications and illustrations of solution feed dry vacuum chlorine dispenser are included in Catalog 61. 12 pages.—*Fischer & Porter Co., 818 Jacksonville Rd., Hatboro, Pa.*

Circle 228N on Reader Service Card

### Mixed-Bed Demineralizers

Bulletin 126 explains in text and photos how mixed-bed demineralizer operates in producing high-purity water by ion exchange method.—*Barnstead Still & Sterilizer Co., 113 Lanesville Terrace, Forest Hills, Boston 31.*

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### Power Transmission

Catalog V-100 contains selection tables for V-belts and sheaves, as well as illustrations of power transmission equipment. 56 pages.

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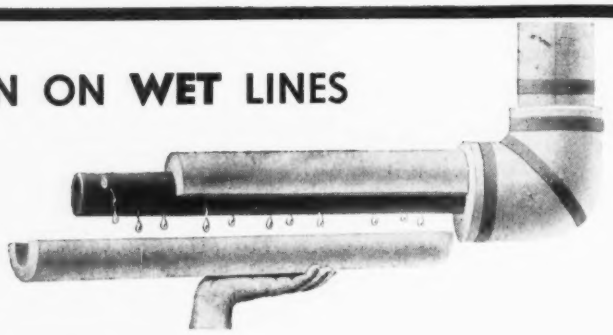
EVEN ON **WET** LINES



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**Can easily be installed by your Maintenance Crew!**

No more "time out" for installation of insulation. Lightweight, economical Vapo-Wall is quick and easy to install under *any* circumstances . . . cuts labor costs, too. Vapo-Wall *lasts indefinitely* on low-temperature lines . . . locks out moisture . . . seals in cold permanently. Immediate shipment from stock of all common sizes of pipe and fitting covers. Write for free booklet and price information.

ONLY Vapo-Wall offers *all* these important specifications:

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- compression strength . . . 25 pounds per square inch
- effective insulation . . . sub-zero temperatures to 190°
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- tough . . . unaffected by sudden temperature changes

MADE OF STYROFOAM® . . . THE MOST NEARLY-PERFECT INSULATING MATERIAL EVER DEVELOPED

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**LEAST EXPENSIVE TO BUY & OPERATE**

**MOST EFFECTIVE FOR HEAVY DUTY CLEAN-UP**

Operated by ordinary plant steam and cold water lines, this unit propels a solid jet of extremely high pressured hot water and detergent. The discharge force completely cleans areas up to 30 ft. from operation point, reaching inaccessible machinery parts. Removes all soil, sludge, and encrusted deposits.

**PROVIDES HIGH TEMPERATURE TO ELIMINATE BACTERIAL GROWTH**

**SAVES TIME & LABOR FOR ANY PLANT WITH 5 PSI STEAM & UPWARD**

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at Henry Fischer Packing Co.

Louisville, Kentucky

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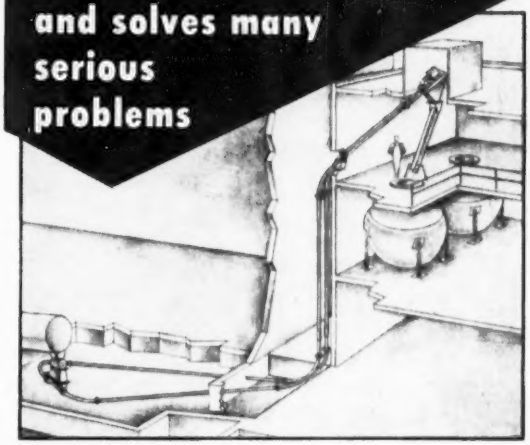
and solves many serious problems



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**A LIQUID-TIGHT CONVEYOR** carries this material from grinder . . . around corners and up three flights . . . discharging directly into one of two cookers. *Result:* Floor space saved, heat loss cut. No spillage, no time lost, *no problem!*

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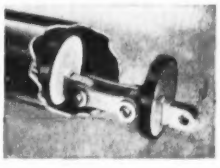

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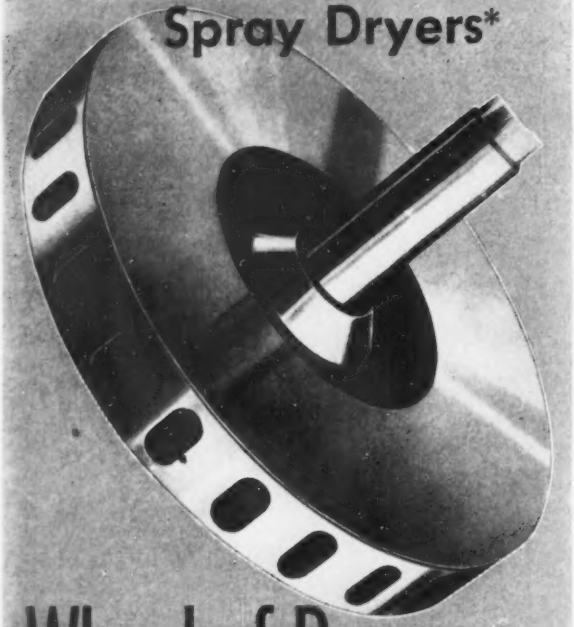
*Hapman* CONVEYORS, INC.

DIVISION HAPMAN-DUTTON COMPANY

KALAMAZOO MICHIGAN

NERCO-NIRO

Spray Dryers*



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For Food Processors

The Nerco-Niro Spray Dryer atomizer wheel shown above symbolizes progress . . . and profits . . . for food processors.

The production of modern foods through the use of Nerco-Niro Spray Dryers is an effective way to better sales. Let our engineers show you how to:

Gain a high percentage of solids recovery.

Assure control of uniformity in particle size.

Maintain effective control of bulk density and in handling liquids of high concentration and viscosity.

Nerco-Niro Spray Dryers are easy to operate, require very little maintenance and consume little power. Laboratory facilities are available to food processors for test purposes.

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NERCO-NIRO SPRAY DRYER DIV.

ROOM 3103

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—*Pyott Foundry & Machine Co., 328 N. Sangamon St., Chicago 7.*

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### Centrifugal Blowers

Centrifugal type blowers and exhausters for air or gas are listed in Bulletin B-6. 32 pages.—*Lamson Corp., Syracuse, N. Y.*

Circle 230A on Reader Service Card

### Oil Burners

Condensed catalog deals with models of oil and combination gas-oil burners. 16 pages.—*Ray Oil Burner Co., 1301 San Jose Ave., San Francisco 12.*

Circle 230B on Reader Service Card

### Deaerating Heaters

Bulletin WC-101A explains specific functions and requirements of deaerating heaters. 8 pages.—*Graver Water Conditioning Co., 216 W. 14th St., New York 11.*

Circle 230C on Reader Service Card

### Bulk Packing System

Bulletin 0153 pictures and describes new and unique bulk packing and handling system. 6 pages.—*Richardson Scale Co., Clifton, N. J.*

Circle 230D on Reader Service Card

### Specialized Equipment

Design and manufacture of specialized equipment for processing, plant operation, handling, and storing, is subject of brochure.—*L. Koven & Brother, Inc., 154 Ogden Ave., Jersey City 7.*

Circle 230E on Reader Service Card

### Process Pumps

Corrosion details of process pumps for handling corrosive and abrasive liquors are described in Bulletin 52B6615C. 8 pages.—*Allis-Chalmers Mfg. Co., 1113 S. 70th St., Milwaukee.*

Circle 230F on Reader Service Card

### Vertical Compressors

Photos, drawings and dimensions illustrate Bulletin A-44 on line of heavy-duty, vertical compressors. 8 pages.—*Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22.*

Circle 230G on Reader Service Card

### Downflow Purifier

Advantages of internal downflow purifier are given in Condensed Bulletin 401. 4 pages.—*V. D. Anderson Co., 1935 W. 96th St., Cleveland 2.*

Circle 230H on Reader Service Card

### Gear Pumps

Illustrations and descriptions of standard and special gear pumps are contained in Bulletin 17-A. 24 pages.—*Schutte & Koerting Co., Cornwall Heights, Bucks County, Pa.*

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### Automatic Boilers

Bulletin 1219 describes packaged automatic boilers in 17 sizes from 15 through 500 hp for steam process as well as heating service. 16 pages.—*Orr & Sembower, Inc., Morgantown Rd., Reading, Pa.*

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## Control Equipment

### Combustion Safeguards

Multiple burner combustion safeguard for ovens, furnaces, kilns, or any gas fired equipment employing two or more burners is described in folder.—*Minneapolis-Honeywell Regulator Co., Brown Instrument Div., Wayne & Windrim Aves., Philadelphia 44.*

Circle 230K on Reader Service Card

### Temperature Control

Bulletin 101 describes temperature control models.—*Burling Instrument Co., 5 Vose Ave., South Orange, N. J.*

Circle 230L on Reader Service Card

### Furnace Control

Control instruments for furnaces, ovens, dryers, and kilns are featured in Catalog P1255.—*Bristol Co., Waterbury 20, Conn.*

Circle 230M on Reader Service Card

### Testing Cabinet

Leaflet cover advantages of testing cabinet for high and low relative humidities.—*Food Technology Inc., 5903 Northwest Highway, Chicago 31.*

Circle 230N on Reader Service Card

### Edge Position Control

Automatically aligning edges of paper, films and foils, edge position control is subject of Bulletin 141. 8 pages.—*Askania Regulator Co., 240 E. Ontario St., Chicago 11.*

Circle 230O on Reader Service Card

### Metal Detector

Leaflet describes electronic metal detector. 4 pages.—*E. W. Brilmayer Laboratories, Inc., 86 Fulton St., New York 38.*

Circle 230P on Reader Service Card

### Speed Drives

All-magnetic amplifier adjustable speed drive is subject of brochure.—*Franklin Control Corp., 1975 S. Allis St., Milwaukee 7.*

Circle 230Q on Reader Service Card

### Filling Scale

Data sheet features automatic filling scale, offering photo, diagram and specifications.—*Thayer Scale & Engineering Corp., E. Water St., Rockland, Mass.*

Circle 230R on Reader Service Card

### Thermostatic Switch

Operation principle and advantages of thermostatic switch are featured in brochure.—*Smith Control & Instrument Co., Inc., Market St., Palmyra, N. J.*

Circle 230S on Reader Service Card

### Psychrometric Thermometers

Measurement of wet and dry bulb temperatures and derivation of dew point and relative humidity with psychrometric thermometer is presented in Catalog 12-A-20. 4 pages.—*Fischer & Porter Co., Hatboro, Pa.*

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### Industrial Filters

Booklet covers industrial filters and quenching oil applications. 4 pages.—*Industrial Filtration Co., Lebanon, Ind.*

Circle 231B on Reader Service Card

### Industrial Meters

Bulletin 18 offers information on complete line of meters, control equipment and engineering services. 16 pages.—*Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10.*

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### Measuring Equipment

Catalog contains data on over 115 testing and measuring devices for lab and production line use. 64 pages.—*General Electric Co., Schenectady, N. Y.*

Circle 231D on Reader Service Card

## Materials Handling

### "Floor Level" Equipment

Junior Catalog 535 presents photos and specifications of "floor level" materials handling equipment. 100 pages.—*Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9.*

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### Hand Pallet Stacker

Bulletin 270X covers completely hydraulic pallet stacker with 2,000 lb. capacity.—*Raymond Corp., 62110 Madison St., Greene, N. Y.*

Circle 231F on Reader Service Card

### Delivery Truck

Colorful leaflet contains data and photos of new model delivery trucks. 4 pages.—*Utility Truck Distributors, Union City, Ind.*

Circle 231G on Reader Service Card

### Conveyor Systems

Conveyor systems, screens and feeders are included in Catalog 53. 28 pages.—*Simplicity Engineering Co., Durand, Mich.*

Circle 231H on Reader Service Card

### Cable Conveyors

Three different types of power driven cable conveyors are listed and described in Bulletin 40. 4 pages.—*E. W. Buschman Co., 4475 Clifton Ave., Cincinnati 32.*

Circle 231I on Reader Service Card

### Car Handling

Simplification of boxcar handling through use of tractor adaptable to track or highway is discussed in brochure. 8 pages.—*Whiting Corp., Harvey, Ill.*

Circle 231J on Reader Service Card

### Tubular Conveyors

Bulletin 123 shows engineering and mechanical details of tubular conveyors. 4 pages.—*Hapman Conveyors, Inc., Kalamazoo, Mich.*

Circle 231K on Reader Service Card

### Telescopic Conveyors

Gravity roller conveyors featuring mobility and telescoping are discussed in booklet. 8 pages.—*Wilkie Co., 5520 Arch St., Philadelphia 39.*

Circle 231L on Reader Service Card

### Air Hoist

Photos and specifications of 1000 lb. air hoist are contained in leaflet. 6 pages.—*Aro Equipment Corp., Bryan, O.*

Circle 231M on Reader Service Card

### Materials Loading

Line of materials loading equipment from boxcar loaders to bin level controls is dealt with in booklet. 4 pages.—*Stephens-Adamson Mfg. Co., Aurora, Ill.*

Circle 231N on Reader Service Card

## Plant Supplies

### Gum Arabic

Bulletin presents general information on gum arabic, including properties, mesh specifications and origin. 4 pages.—*Morningstar, Nicol, Inc., 630 W. 51st St., New York 19.*

Circle 231O on Reader Service Card

### Flexible Metal Tubing

Catalog 200 colorfully illustrates and describes helically-wound flexible metal hose and helically-corrugated flexible metal hose. 50 pages.—*Titeflex Inc., 500 Frelinghuysen Ave., Newark 5, N. J.*

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### Rust Inhibitor

Method of controlling corrosion and rust in unit coolers, cold air diffuses, and spray deck refrigeration systems is explained in folder.—*Calgon, Inc., Hagan Bldg., Pittsburgh 30.*

Circle 231Q on Reader Service Card

### Food-Grade Antioxidants

Use of food-grade antioxidants in broad range of products is described in Bulletin 6. 4 pages.—*Eastman Chemical Products, Inc., Kingsport, Tenn.*

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### Water Repellants

Leaky masonry walls and moisture penetration are stated solved with use of water repellant in leaflet. 4 pages.—*L. Sonneborn Sons, Inc., 404 Fourth Ave., New York 16.*

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THAT

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PRODUCTS

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HAVE QUALITIES WHICH

MAKE THEM

ESSENTIAL INGREDIENTS

IN THE PREPARATION OF

FOODS

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CORN PROCESSING DIVISION

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CORN SYRUPS • CORN STARCHES • LACTIC ACID

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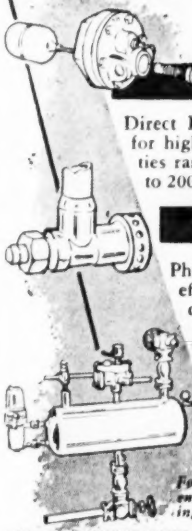

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Direct Feed and Remote Feed types adaptable for high side or low side applications. Capacities range from 1 to 1000 tons for "Freon"; 1 to 2000 tons for ammonia.

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Phillips refrigerant injection provides high efficiency evaporation with "Freon", especially in high capacity, flooded operation.

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***RENEWABLE RUBBER COVER.*** The sturdy cover protects the nozzle and your equipment against knocks and dents. When the cover becomes worn, replace it with a new one.

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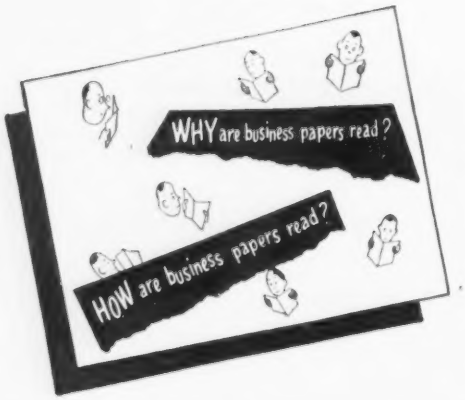


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### Wiring Conduit

Flexible, waterproof electrical wiring conduit is described in Bulletin UA-530. 4 pages.—*American Brass Co., American Metal Hose Branch, 692 Main St., Waterbury, Conn.*

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### Essential Oils

Catalog covers line of essential oils, balsams, oleoresins, and flavors. 48 pages.—*Magnus, Mabee & Reynard, Inc., 16 Desbrosses St., New York 13.*

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### Tube Fittings

Flareless, bite-type fittings for heavy wall tubing are presented in leaflet.—*Parker Appliance Co., 17325 Euclid Ave., Cleveland 12.*

Circle 232C on Reader Service Card

### Industrial Adhesives

Booklet features production and applications of industrial adhesive. 16 pages.—*H. B. Fuller Co., 255 Eagle St., St. Paul 2, Minn.*

Circle 232D on Reader Service Card

### Dry Ice Bunkers

Folder gives data on use of blowers type dry ice bunkers in truck refrigeration. 6 pages.—*Foster-Built Bunkers, Inc., 757 W. Polk St., Chicago 7.*

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### Rigid-Plastic Boxes

Wide assortment of clear rigid-plastic boxes is subject of brochure.—*Tri-State Plastic Molding Co., Inc., Henderson, Ky.*

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### Glassine Samples

Folder contains samples of opaque glassine designed for food wrapping and labeling.—*Rhinelander Paper Co., Rhinelander, Wis.*

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### Fire Extinguishers

Carbon Dioxide extinguishers which expand stored volume 450 times within 26 seconds are treated in leaflet.—*American-La-France-Foamite Corp., Elmira, N. Y.*

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## Miscellaneous

### Silicone Data

*What's a Sillicone* provides detailed explanation of the polymers and their uses. 34 pages.—*Dow Corning Corp., Midland, Mich.*

Circle 232I on Reader Service Card

### Loose Leaf Binders

Variety of styles and colors of loose leaf binders is contained in Booklet LL234. 40 pages.—*Remington Rand Inc., 315 Fourth Ave., New York 10.*

Circle 232J on Reader Service Card

### Industrial Instrumentation

Bulletin 7302 describes role of instruments in modern water, sewage, and waste treatment processes. 24 pages.—*Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne & Windrim Aves., Philadelphia 44.*

Circle 232K on Reader Service Card

### Power Distribution

Photos, charts, and diagrams illustrate Industrial Power Distribution Idea Book. 28 pages.—*General Electric Co., Schenectady, N. Y.*

Circle 232L on Reader Service Card

### Sanitation Guide

Sanitation in plant operations in food processing, poultry and meat packing industries are covered in colorful folders.—*Food & Beverage Dept., Wyandotte Chemicals Corp., Wyandotte, Mich.*

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### Canning Sanitation

*Sanitation in the Canning Industry* contains detailed information on canning operations, microbiology, and canning sanitation problems and solutions. 40 pages.—*Klenzade Products, Inc., Beloit, Wis.*

Circle 232N on Reader Service Card

### Accounting Machine

Use of machine in handling accounts receivable and payable is described in brochure. 6 pages.—*Remington Rand Inc., 315 Fourth Ave., New York 10.*

Circle 232O on Reader Service Card

### Hair Guards

Sanitary and comfortable hair guards for women employed in food plants are dealt with in leaflet. 4 pages.—*Regal Mfg. Co., 3203-05 Elston Ave., Chicago 18.*

Circle 232P on Reader Service Card

### Sprinkler Irrigation

Illustrated booklet presents line of irrigation pumps for sprinkler systems. 12 pages.—*Marlow Pumps, Ridgewood, N. J.*

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**QUAKER CITY COLD STORAGE CO., Inc.**
**PHILADELPHIA, PA.**
**3 WAREHOUSE LOCATIONS**
***Proper Temperature for Frozen Foods***

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For the Food Processor

**CARROT OIL makes foods golden yellow**

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 35 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

**SEND FOR BOOKLET**
New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

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**Two 4 Spout Mayonnaise Fillers**
Manufactured by Filler Machine Company complete with 220/440 motor and discharge disc. Purchased new 1948—excellent condition. Located on West Coast.
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**STAINLESS STEEL VOTATOR**
for cooking and cooling fillings and custards, capacity 1500 lbs. an hour. 3 cylinders, steam freon and water 4" diameter, range 240° to 40°.
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**1—#2 Day Brighton Pony Mixer**
**1—Size 15 Class C Type VII Baker Perkins Mixer**
FS-8053, Food Engineering
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**1 SWEETLAND FILTER**
Serial #9452R—18 plates—excellent condition. Can be inspected at
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5—8,525 gal. one-piece A. O. Smith, glass-lined tanks, measuring 10' diameter by 16' long, immediate delivery; ideal for all types of foods; with manholes and sanitary fittings.

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**60 a minute Cartoning Line**
**Bottom and Top Sealers**
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Baker Perkins BB, Unidor (Vacuum) 4 to 150 gal. Double Arm Jacketed Mixers, Sigma or Fish Tail Blades.
Koven 2500 gal. Steam Jacketed Spiral Paste Mixer.
Day, Robinson Dry Powder Mixers and Sifters, 200, 600, 1300, 10,000 lbs.
Day 75 gal. Imperial, D.A. Jacketed Mixer.
850 gal. Steel Vertical S.J. Mixer.
B.P. type 3500 gal. Steam Jacketed Double Arm Mixer.
Day 650 gal. Jacketed Jumbo Mixer.
Stokes, Day, New Era, Hottman Mixers, 2 to 3500 gals. with without Jackets, Single and Double Arm Agitators.
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Mikro 4TH, 3TH, 3W, 1SH, Bantam Pulverizers; Schultz O'Neill Mills.
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Colton 2, 3 Rotary & 4 Tablet Machines.
Pony M Labelrite; Ermold, World semi and fully automatic Labelers.
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S. & S. G1 and G6 Auger Fillers.
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Standard-Knapp No. 429 Carton Sealer.
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Hayssen; Package Machy. Co. FA, FA4, DF, CA2; Miller and Scandia automatic cellophane Wrappers.
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# ADVERTISERS IN THIS ISSUE


Advance Oven Co. ... 106
Allegheny Ludlum Steel Corp. ... 141
Allied Chemical & Dye Corp.
National Aniline Div. ... 35
Allis-Chalmers Mfg. Co. ... 4
Aluminum Cooking Utensil Co., Inc., The ... 93
Alvey Conveyor Mfg. Co. ... 180
Amercoat Corporation ... 25
American Can Company ... 114–115
American Gas Association ... 22
American Spice Trade Assoc. ... LC229
Ames Iron Works ... BL225
Anchor-Hocking Glass Corp. ... 140
Aseptic Thermo Indicator Co. ... BR209
Atlas Powder Co. ... 152

Babcock & Wilcox Co., The ... 12
Bakelite Co., a div. of Union Carbide & Carbon Corp ... 221
Ball Brothers Co. ... 150
Barry-Wehmiller Machinery Co. ... 166
Bliss Co., E. W. ... 240
Bristol Co., The ... 96
Buffalo Forge Co. ... 84

Cambridge Wire Cloth Co., The ... 186
Canning Machinery Div., Food Machinery & Chem. Corp. ... 8
Carpenter Steel Co., The ... 32
Century Electric Co. ... 29
Chemical Industries, Exposition ... BR211
Cherry-Burrell Corp. ... 226
Chicago, Burlington & Quincy R. R. Burlington Lines ... 170
Chisholm-Moore Hoist Div. Columbus McKinnon Chain Corp. ... 198
Cleaver-Brooks Co. ... 168
Clinton Foods Inc. ... TR231
Cochrane Corp. ... 224
Continental Can Co. ... 90
Corn Products Refining Co. ... 36
Crane Company ... 107
Crucible Steel Co. of America ... 119
Cyclone Fence Dept., U. S. Steel Corp. ... TR209

Darling Valve & Mfg. Co. ... 200
Day Company, The ... 30
Day Co., J. H., The ... 28
De Laval Separator Co., The ... 136
Dempster Brothers, Inc. ... 174
Dings Magnetic Separator Co. ... 37
Distillation Products Industries ... 137
Dodge Mfg. Corp. ... 14-15
Dodge & Olcott, Inc. ... 108
Drehmann Paving & Flooring Co. ... 129
duPont de Nemours & Co., E. I., Polychemicals Dept. ... 131

Economic Machinery Co. ... 172
Electric Storage Battery Co., Inc., The 139
Empire Box Corp. ... 42
Entoleter Div. The Safety Car Heating & Lighting Co., Inc. ... BL210
Eriez Manufacturing Co. ... R225

Firmenich Inc. ... 239
Fiske Bros. Refining Co., Lubriplate Div. ... 202
Food Machinery & Chem. Corp., Canning Machinery Div. ... 8
Foxboro Co., The ... 18
Frick Company ... TL210
Fritzsche Bros. Inc. ... 188

Gair Co., Inc., Robert ... 101
Gaylord Container Corp. ... Third Cover
General Amer. Trans. Corp., Louisville Dryer ... 6
General Dynamics Corp. ... 178
General Electric Co. ... 132–133
General Electric Co., Electronics Div., Commercial Equip. Dept. ... 116
Globe Woven Belting Co., Inc. ... 191
Gottscho Inc., Adolph ... TR213
Gould National Batteries, Inc. ... 125
Griffith Labs., Inc., The ... 88

Hamilton Copper & Brass Wks. ... 145
Hapman Conveyors, Inc. ... R229
Hinde & Dauch ... 185
Hoffmann La Roche, Inc. ... 192
Hudson Sharp Machine Co. ... 204
Huron Milling Co., The ... 118

Ingersoll-Rand ... 130
Ingredients for the Food Processor ... 233

Jamison Cold Storage Door Co. ... 128
Jeffrey Manufacturing Co. ... TR-227
Jenkins Brothers ... 142
Johns-Manville Corp., Refrigeration Insulation ... 122
Jones & Laughlin Steel Corp. ... 146
Josam Manufacturing Co. ... 113

Keasbey & Mattison Co. ... 151

La Porte Mat & Mfg. Co. ... BR217
Link Belt Co. ... 17, 23, 31
Littleford Bros., Inc. ... 212
Lubriplate Div., Fiske Bros. Refining Co. ... 202

MMM, Inc. ... 228
Magnus, Mabee & Reynard, Inc. ... 98
Malayan Tin Bureau, The ... 134
Master Electric Co., The ... 87
McGraw Hill Book Co., Inc. ... L220
Merck & Co., Inc. ... 208
Minneapolis Honeywell Reg. Co., Industrial Div. ... 120–121
Monarch Mfg. Works, Inc. ... 219
Multi-Clean Products, Inc. ... 195
Mundet Cork Corp. ... 201

Nash Engineering Co. ... 34
Nashua Corp. ... 199
National Airoil Burner Co., Inc. ... 195
National Aniline Div., Allied Chemical & Dye Corp. ... 35
National City Bank of N. Y., The ... 207
Niagara Blower Co. ... 203
Nichols Engineering & Research Corp. 230
Nicholson Co., W. H. ... TR217
Norda Essential Oil & Chem. Co., Inc. 214
Nutritional Research Associates ... 233

Oakite Products, Inc. ... 190
Oilgear Company, The ... 43

Package Machinery Co. ... 177
Paisley Products Inc. ... 10
Palmer Thermometers, Inc. ... 218
Pfaudler Co., The ... 39
Pfizer & Co., Inc., Charles ... 26–27
Philadelphia Quartz Co. ... TR220
Phillips & Co., H. A. ... BR231
Pitney-Bowes, Inc. ... 197
Pittsburgh Corning Corp. ... 135
Platecoil Div. of Tranter Mfg. Inc. ... 154
Powell Valves ... 156
Pure Oil Co., The ... 19

Quaker City Cold Storage Co., Inc. ... 233

Reeves Pulley Co. ... 94
Republic Steel Corp. ... 153
Rheem Mfg. Co. ... 123
Riegel Paper Corp. ... 183
Rietz Manufacturing Co. ... TL206
Ryerson & Son, Inc., J. T. ... 44

Scandia Mfg. Co. ... 162
Schoettle Co., Edwin J. ... 127
Schutte & Koerting Co. ... 117
Seaplant Chemical Corp. ... 223
Seedburo Equipment Co. ... TL225
Sellers Injector Corp. ... TL229
Sparks & Co., A. J. ... 222
Spraying Systems Co. ... BR227
Staley Mfg. Co., A. E. ... 21
Standard Oil Co. (Indiana) ... 33
Standard Steel Corp. ... 181
Stearns Magnetic, Inc. ... 194
Sterling Electric Motors ... 20
Sterwin Chemicals, Inc., Vanillin Div. ... Second Cover
Strahman Valves, Inc. ... 232
Sturtevant Mill Co. ... 41
Sutton, Steele & Steele, Inc. ... 184

Taylor Instrument Cos. ... 148–149
Thermoid Co. ... 144
Timken Roller Bearing Co., The ... 155
Toledo Scale Co. ... 187
Trailmobile Inc. ... 124
Trent Tube Co. ... 38
Triangle Package Machinery Co. ... 189
Tri-Clover Machine Co. ... 24

Union Carbide & Carbon Corp., Bakelite Co. ... 221
United States Electrical Motors, Inc. ... 109–110
United States Steel Products Div., United States Steel Corp. ... 82
United States Steel Corp., Cyclone Fence Dept. ... TR209
U. S. Steel Products Div. ... 82
United States Stoneware Co., The ... 164

Van Ameringen-Haebler, Inc. ... 40
Victor Balata & Textile Belting Co. ... BL206
Viking Pump Co. ... BR213
Visking Corp., The ... 147

Wallace & Tiernan Co., Inc. ... 205
Walworth Co. ... 16
Western Precipitation Corp. ... Fourth Cover
Westinghouse Electric Corp., Sturtevant Div. ... 126
Where to Store Frozen Foods ... 233
White Motor Co., The ... 143
Wyandotte Chemicals Corp. ... 179

Yarnall-Waring Co. ... TR211
York Corporation ... 138


## SALES REPRESENTATIVES

**ATLANTA 3** ... Robert H. Sidur
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PROFESSIONAL SERVICES ... 233


## SEARCHLIGHT SECTION
*(Classified Advertising)*
H. E. Hilty, Mgr.


EMPLOYMENT
Positions Vacant ... 234
Positions Wanted ... 234
Selling Opportunities Wanted ... 234
Employment Services ... 234

BUSINESS OPPORTUNITIES
Offered ... 234

PROPERTY
Wanted ... 234

EQUIPMENT
(Used or Surplus New)
For Sale ... 234

WANTED
Equipment ... 234


## ADVERTISERS INDEX


Aaron Equipment Co. ... 237
Allied Equipment Co. ... 235
Briggs & Turivas Inc. ... 237
Brill Equipment Co. ... 237
Consolidated Products Co., Inc. ... 237
Cott Beverage Corp. ... 234
Davis Supply Co. ... 234
Drake Personnel Inc. ... 234
Equipment Clearing House Inc. ... 235
First Machinery Corp. ... 236
Gale, J. C. ... 234
Gelb & Sons Inc., R. ... 235
Glidden Co., The ... 234, 237
Grocery Store Products Co. ... 234
Kehoe Machinery Corp., Lester ... 235
Loeb Equipment Supply Co. ... 235
Machinery & Equipment Corp. ... 236
Perry Equipment Corp. ... 237
Process Industries ... 236
Ravarino & Freschi Inc. ... 234
Savage Bros. Co. ... 237
Union Standard Equipment Co. ... 235
Young Foods Inc., W. T. ... 234

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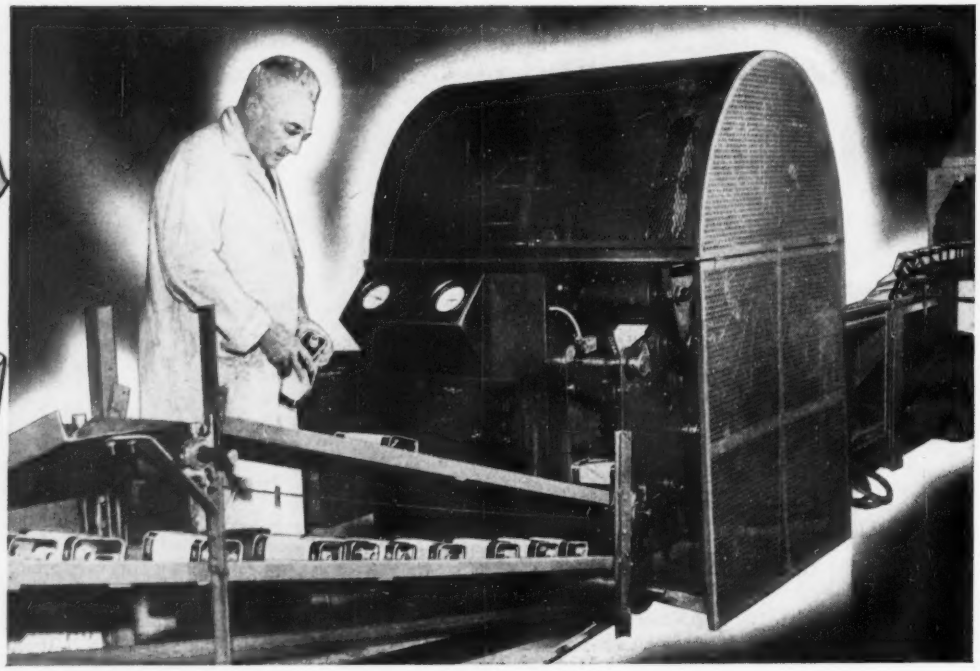


# The BLISS 318-- Here's a practical can tester for medium speed production lines

The 18 testing heads of the Bliss 318 handle F-style cans in half-pint, pint and quart sizes at up to a 150-per-minute rate . . . square and rectangular cans up to 100 per minute, including those with handles and spouts.

**SIMPLE, FOOLPROOF TEST**—As cans feed into the Bliss 318, they're enclosed by one of the 18 air-tight testing buckets. Compressed air is then pumped to the can. Even the slightest pinhole leak in the can will cause air pressure in the bucket to rise. When that happens the can is ejected automatically. It's a simple, thoroughly-dependable way to eliminate "leakers".

**COMPLETELY AUTOMATIC**—The Bliss 318 Automatic Air Can Tester needs no operator. An electrically-controlled stop-and-start feeding system completely eliminates jams—*automatically*. All cans are tested and passed or rejected—*automatically*. And the simple, rugged construction of the 318 means trouble-free performance, a minimum of maintenance.

**COMPACT**—Easy to install in your production line, the Bliss 318 only requires a floor space of approximately 5 x 6 feet.

**MODERATELY PRICED**—The Bliss 318 Can Tester gives you the advantages of many larger testers—at a lower cost! Can you use a Bliss 318 on your line? It's easy to find out. Call in a Bliss Can Machinery Specialist to study your production line set-up and make his recommendations. There's no obligation on your part, of course.

**E. W. BLISS COMPANY**
**50 Church Street, New York 7**

## BLISS on your machine is more than a name...*it's a guarantee*

**BLISS CAN AND CONTAINER MAKING MACHINERY**

SLITTERS

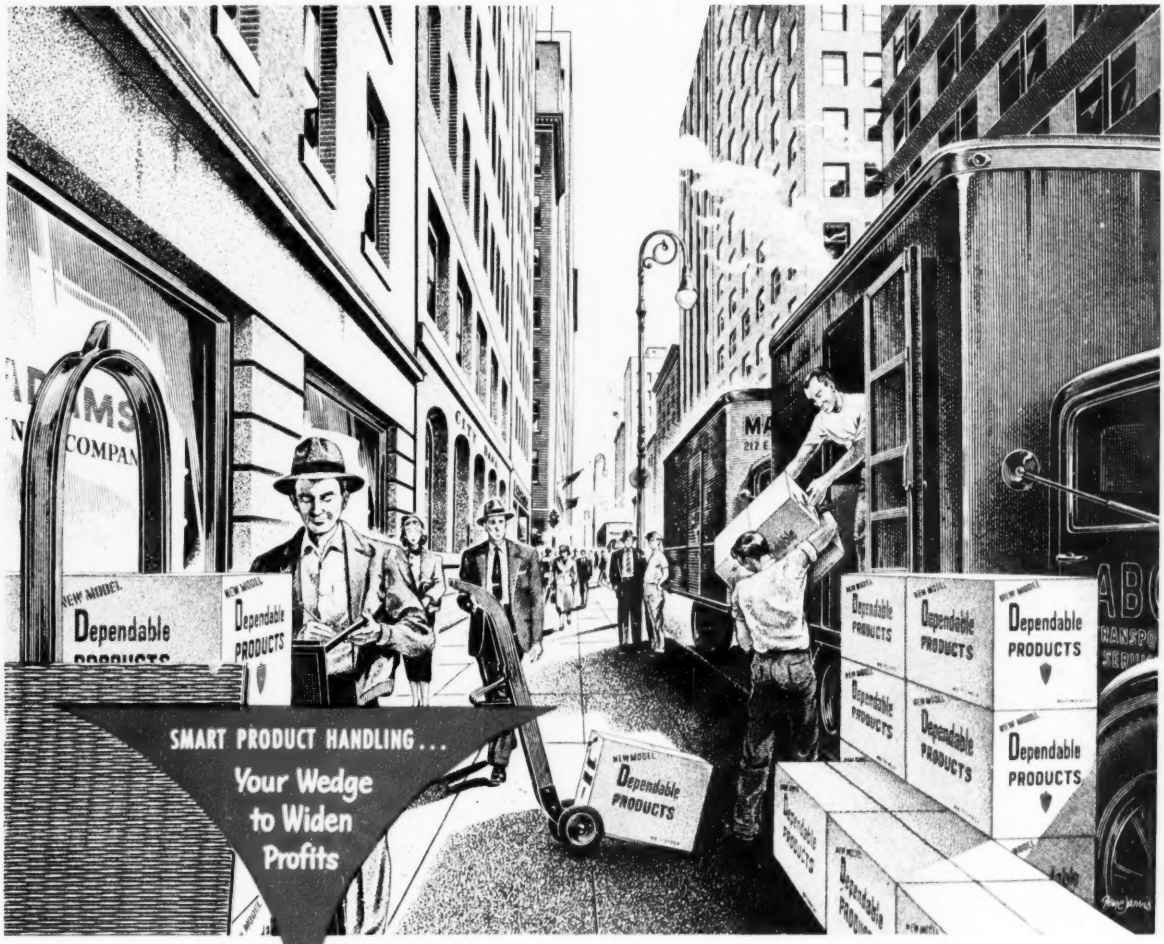
BODYMAKERS

FLANGERS

SEAMERS

TESTERS

STRIP FEED PRESSES

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There are no extra freight charges for shipping a solid sales message on every attractively printed Gaylord box. You profit because your shipping dollars do double duty by promoting your product all along your channels of distribution. With these Gaylord "traveling billboards" you'll regularly reach hundreds of important buyers, sellers and handlers who see your product before it's unpacked. Sizes, shapes and designs that work to promote your product, as well as to protect it, are an important Gaylord "extra" service . . . and with Gaylord's quality of materials and workmanship, you can be sure every box is as brawny as it is beautiful. For information and cooperation, phone your nearby Gaylord office.

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*Technical data on the revolutionary new*

# holo-flite*

(HOLLOW-FLIGHT)

## PROCESSOR

**—the Continuous-Flow Heat-Exchanger that is setting new standards of**

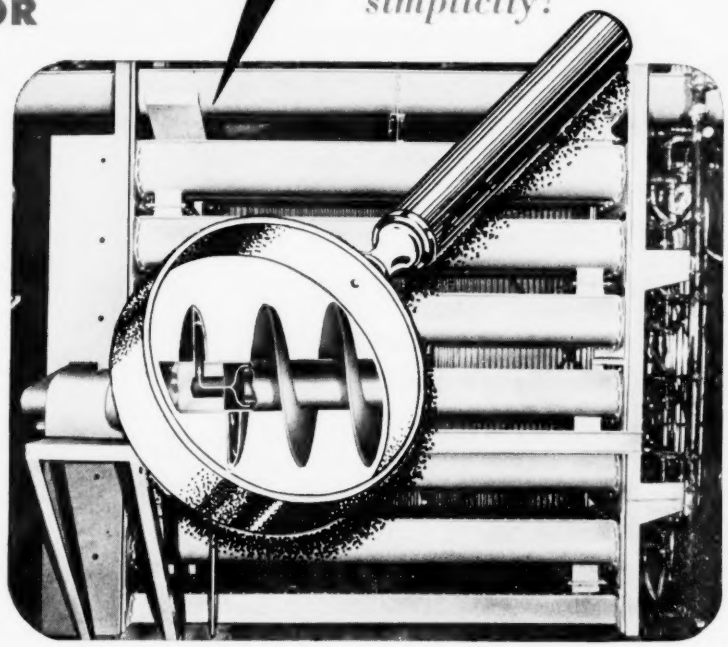
*compactness!*
*adaptability!*
*simplicity!*

If you have processing operations where slurries, solids, pulps or pastes must be cooled or cooked, be sure to investigate the many unique advantages of the newly-developed HOLO-FLITE Processor before you install *any* heat-exchange equipment.

**Here's the HOLO-FLITE principle . . .**

Two or more screw conveyors rotate slowly in a trough. The blades and shaft of each flight of conveyors are hollow, with provision for circulating the heat-transfer agent through them. The product to be cooled or cooked is moved along the trough, being constantly rotated into, around, over and under the conveyor screws as it moves.

Thus, a continuous thermal transfer takes place between the product and the heat-transfer fluid circulating in the blades. The product is cooled or cooked in *continuous-flow* without the "stop-and-go" losses of batching operations . . . and cooled products can be packaged directly from the HOLO-FLITE discharge—saving space, time and additional handling.



THIS 6-TIER HOLO-FLITE cools 7 tons of cottonseed press cake per hour from 285° to 89°F. *in a total floor space of only 28 sq. ft.* *(Insert)* Enlarged cutaway view of HOLO-FLITE screw showing heat-transfer principle.

## Here are typical HOLO-FLITE advantages

The HOLO-FLITE principle is so unique it is setting completely new standards of performance in *many* ways. For example . . .

*Reg. T.M.

**The HOLO-FLITE Saves Space**—It requires as little as 1/5th the space of other units of comparable capacity because (1) it has far greater heat-transfer area per cubic foot of space . . . and (2) the flights can be "tiered" as high as desired to give maximum capacity in very small floor areas.

**The HOLO-FLITE is Versatile**—Processed product can be fluid, pulp or paste—granular, crystalline or powdered solid. Heat-transfer fluid can be refrigerant, cooled or ambient water, steam, oil or any other desired fluid, at any normal temperature range.

**The HOLO-FLITE Is Dust-Free**—Its gentle action provides large heat-transfer action without dust and with negligible particle abrasion. Simplifies installations, assures higher quality product.

**The HOLO-FLITE Is Adaptable**—It can easily be designed to handle virtually any capacity by (a) varying the diameter of the screws (7" to 16") . . . (b) varying the length of the screws (8 ft. to 20 ft.) . . . (c) varying the number of intermeshing screws per trough (2, 4, or 6) . . . and (d) varying the number of tiers stacked on top of one another (1 to 10, or more).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The HOLO-FLITE is in daily operation on such typical products as sand, cement, cottonseed cake, soybean meal, borax, salt, sugar, baby foods and many other equally-varied products.

**What is your problem?** *Our engineers will be glad to assist you in making the most of* HOLO-FLITE *advantages. Write wire, or phone the office nearest you!*

Want More Facts? This 8 page booklet describing the HOLO-FLITE in greater detail will gladly be sent on request. No obligation, of course.